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The Experimental and Clinical Use of Polymyxin, Chloromycetin, and Aureomycin

PERRIN H. LONG, M.D., EMANUEL B. SCHOENBACH, M.D., ELEANOR A. BLISS, Sc.D., MORTON S. BRYER, M.D., and CAROLINE A. CHANDLER, M.D., *Baltimore*

SUMMARY

Polymyxin is an effective antibiotic for the treatment of severe infections produced by Ps. aeruginosa, H. pertussis, H. influenzae, E. coli, and A. aerogenes. Its toxicity to date precludes its general use in infections susceptible to its therapeutic effects.

Chloromycetin has been demonstrated to be an effective antibiotic agent for the treatment of rickettsial diseases and typhoid fever. It will undoubtedly prove effective in the treatment of other infections produced by certain Gram-negative micro-organisms and viral agents.

Aureomycin has been shown to be an active antibiotic agent against rickettsial diseases, primary atypical pneumonia, acute brucellosis, pneumococcal, streptococcal, and staphylococcal infections, urinary tract infections produced by E. coli, A. aerogenes and Strept. fecalis, certain types of infections of the eye, and in subacute bacterial endocarditis when the infecting agent is Strept. fecalis. Its clinical use in forms of extrapulmonary tuberculosis is in a completely experimental stage. It is not recommended in typhoid fever or in infections due to Ps. aeruginosa or P. vulgaris, and it seems to be ineffective in whooping cough.

To date, neither chloromycetin nor aureomycin has shown significant signs of systemic toxicity.

DURING the past 18 months, three new antibiotic agents, polymyxin,* chloromycetin,† and aureomycin,‡ have been described. The purpose of this presentation is to discuss certain observations which have been made regarding the antibacterial or bacteriostatic activity, the pharmacology and toxicity, the comparative effectiveness in experimental infections, and the potential clinical uses and value of these three compounds.

BACTERIAL AND BACTERIOSTATIC ACTIVITY

It can be said that, from the point of view of antibacterial activity, the polymyxins are definitely more effective *in vitro* than is streptomycin against certain Gram-negative bacteria. In our experience polymyxin D has from two to eighty times the activity of streptomycin against susceptible bacteria (see Table 1).

Furthermore, the activity of polymyxin is primarily bactericidal in the concentrations used, while that of streptomycin is bacteriostatic. Another point

*References 1, 4-6, 9-11, 26, 36, 46-48.
†References 3, 21, 32, 33, 40-44, 50, 53.
‡References 2, 7, 8, 12-20, 23-25, 27-31, 34, 35, 37-39, 45, 49, 51, 52.

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From the Department of Preventive Medicine, The Johns Hopkins University School of Medicine. These investigations were supported by grants from the Abbott Laboratories; Eli Lilly and Company; Lederle Laboratories Division, American Cyanamid Company; Parke, Davis and Company; The Upjohn Company; and the Antibiotic Study Section, Division of Research Grants and Fellowships, The National Institutes of Health, Public Health Service of the Federal Security Agency. Polymyxin D and aureomycin were furnished by the Lederle Laboratory Division, American Cyanamid Company. Polymyxin B was supplied by Burroughs-Wellcome Company and chloromycetin by Parke, Davis and Company.

TABLE 1.—*Comparison of Streptomycin, Polymyxin D, Penicillin G in Vitro*

GRAM-NEGATIVE BACILLI

Organism		Minimal Inhibitory Concentration (Gamma/cc.) Streptomycin	Poly. D
E. coli	No. 4	6.25	.16
	No. 9	6.25	.16
E. communior	No. 14	2.5	.62
Citrobacter	No. 6	5.0	.62
Aerobacter	No. 10	>100	1.25
	No. 12	2.5	1.25
Friedlander	A	.62	.31
	B	5.0	.62
Pyocyaneus	Her.	25	1.25
	Cal.	100	2.5
	But.	100	2.5
	No. 16	50	2.5
Proteus	No. 11	5	>100
	No. 17	5	>100
	No. 18	5	>100
	Her.	12.5	>100

GRAM-POSITIVE COCCI

Organism		Minimal Inhibitory Concentration (Gamma/cc.) Streptomycin	Peni. G
Streptococcus:			
Beta Gr. A	C203	12.5	.008
D	Zymo.	50	2.5
	22 A	50	2.5
Alpha fecalis	Bla.	50	2.5
	Twy.	10	2.5
Pneumococcus I	SVI	12.5	.016
	Baily	2	.012
Staphylococci:			
Aureus	Zeut.	12.5	.062
	Zorn.	2	.062
Albus	Heatly	2	.016

of interest is that the authors have been unable to produce resistant organisms by exposure to polymyxin over long periods of time. Chloromycetin and aureomycin exert bacteriostatic effects on certain Gram-positive and Gram-negative bacteria *in vitro*. In testing these effects, the comparison for Gram-positive organisms has been made with penicillin, while streptomycin has been used for comparison in the instance of the Gram-negative organisms. Aureomycin was found to be from four to sixteen times as active as was chloromycetin against streptococci, pneumococci, and staphylococci, and from ten to eighty times less effective than penicillin against these organisms except in the instance of streptococci belonging to Group D in Lancefield's classification. When Gram-negative organisms were tested, the bacteriostatic activity of aureomycin and chloromycetin were comparable, but generally less than the antibacterial activity of polymyxin (see Tables 2 and 3).

The exceptions to this statement are the relative effectiveness of chloromycetin again certain strains of P. vulgaris, and the almost total lack of activity of chloromycetin and aureomycin against strains of Ps. aeruginosa. Aureomycin has also been tested against 11 strains of organisms belonging to the Brucella group and has been an effective bacteriostatic agent after 72 hours in concentrations of 0.25 to 2.0 micrograms per ml. or less. Other investigators have reported that polymyxin[9, 46] has an antibacterial effect against A. aerogenes, S. typhosa, E. coli, K. pneumoniae, P. multocida, S. gallinarum, S. pullorum, and S. flexner; that chloromycetin[44] has a bacteriostatic action against S. schottmulleri, Shig. paradysenteriae (Sonne), B. mycoides, Borrelia recurrentis, Br. abortus, Br. suis, Br. melitensis, S. typhosa, H. pertussis, P. tularense, selected strains of Mycobacterium tuberculosis, V. hominis, and certain yeasts and filamentous fungi; and that aureomycin[24, 30,31] has a similar effect against various strains of Salmonella, N. catarrhalis, N. gon-

TABLE 2.—*Comparison of Chloromycetin, Aureomycin, Polymyxin D in Vitro*

GRAM-NEGATIVE BACILLI

Organism		Minimal Inhibitory Concentration (Gamma/cc.) Chloro.	Aureo.	Poly D.
E. coli	No. 4	5	5	.165
	No. 9	10	5	.156
E. communior	No. 14	5	5	.625
Citrobacter	No. 6	5	5	.625
Aerobacter	No. 10	5	5	1.25
	No. 12	5	2.5	1.25
Friedlander	A	1.25	1.25	.312
	B	5	5	.625
Pyocyaneus	Her.	>100	100	1.25
	Cal.	100	100	2.5
	No. 16	>100	100	.625
	But.	100	100	2.5
Proteus	No. 11	<3.1	.625	>100
	No. 17	12.5	50	>100
	No. 18	25	100	>100
	Her.	12.5	100	

TABLE 3.—*Comparison of Chloromycetin, Aureomycin, Penicillin G in Vitro*

GRAM-POSITIVE COCCI

Organism		Minimal Inhibitory Concentration (Gamma/cc.) Chloro.	Aureo.	Peni. G
Streptococci:				
Beta Group A	C203	5	.312	.008
B	090	5	1.25	.016
B	19	5	.625	.035
C	K61	5	.625	.016
D	Zymo.	10	1.25	2.5
D	22A	10	.625	2.5
F	For.	2.5	.625	.05
F	H59	5	1.25	.016
Alpha fecalis	Bla.	10	1.25	2.5
	Tar.	10	1.25	2.5
	West.	10	1.25	2.5
Viridans	Dop.	5	.625	.625
	Keel.	10	.625	2.5
Pneumococcus I	SVI	2.5	.312	.016
Staphylococci:				
Aureus	Zeut.	5	.625	.062
	Zorn.	5	.625	.062
	Gelb.	5	.625	.062
	Gibb.	10	.625	.012
Albus	Heatly	5	.625	.012

orrheae, N. meningitidis, pleuropneumonia-like organisms, S. typhosa, H. hemolyticus, and certain other micro-organisms. Paine and co-workers[31] have reported that they have been able to produce resistance to aureomycin in certain strains of A. aerogenes and Kl. pneumoniae by repetitive cultivation in media containing the antibiotic, and the authors of this presentation have occasionally been able to produce a fourfold increase in the resistance to aureomycin of a strain of micro-organisms. However, such experiences are infrequent and of a low order, which makes the interpretation of their real meaning difficult. The conclusion has to be that it is difficult to produce resistance *in vitro* to aureomycin.

EXPERIMENTAL TOXICITY

Polymyxin D is moderately toxic for white mice, the LD_{50} being 250 to 300 mg. per kg. of body weight when the antibiotic is given by a single subcutaneous injection. Because of its relative insolubility, it is difficult to determine the LD_{50} of chloromycetin for mice. However, it has been reported that the LD_{50} of this compound in propylene glycol is 245 mg. per kg. when it is administered to white mice by the intravenous route. For aureomycin, the LD_{50} for white mice was found to be 3,500 mg. per kg. when this antibiotic was given by the subcutaneous route. In larger animals, such as dogs, 10 mg. of polymyxin D per kg. injected twice a day by the intramuscular route for seven days was well tolerated. With chloromycetin, dogs receiving from 72 to 80 mg. per kg. per day by the intramuscular route for 38 doses (five days a wek) developed varying degrees of anemia during the period of the test, while dogs receiving 40 mg. per kg. per day of aureomycin for nine days by the intramuscular route showed signs of anorexia and loss of weight. Because the hydrochloride of aureomycin, which is quite acid, was used in these tests, varying degrees of local necrosis were noted in these experimental animals. Neither polymyxin, nor aureomycin, nor chloromycetin produced any significant changes in the leukocyte counts, blood sugar, or liver function tests in the experimental animals. All samples of polymyxin tested to date have produced albumin, casts, leukocytes and erythrocytes in the urine of rats which had received polymyxin intravenously in daily dosage of 20 mg. per kg. Histological examinations of the kidneys of such rats show definite evidence of lower nephron damage. Certain specimens of polymyxin have produced symptoms and signs of histamine shock when injected into rats by the intramuscular route. It is possible that these reactions resulted from impurities in the material under test.

PHARMACOLOGY

Polymyxin D passes readily into the blood stream following its intramuscular injection into dogs. Ninety minutes after dogs had received single intramuscular doses of 5 or 10 mg. per kg., concentrations of 2.5 and 5.0 micrograms of polymyxin per ml. were recorded. Detectable amounts of the antibiotic were still present in the serum at three and one-half hours. When dogs were given 5 or 10 mg. of the compound per kg. twice daily for seven days, concentrations of from 10 to 20 mg. of polymyxin per ml. of serum were noted. No polymyxin was detected in the spinal fluid of dogs in which high concentrations of polymyxin were present in the serum. When polymyxin was administered to human beings in divided doses by the intramuscular route at intervals of three hours in amounts not to exceed a total daily dose of 3 mg. per kg. of body weight, concentrations of 0.6 to 1.3 micrograms of the antibiotic per ml. were noted in the sera after 24 hours of therapy. Detectable amounts of the antibiotic were present in the urine of these patients. To date it has not been found in the spinal fluid of patients suffering from purulent meningitis and treated with this antibiotic.

Aureomycin deteriorates quite rapidly when placed in solution. It is also bound by the proteins of blood serum in varying degrees. Hence, when biological testing against a strain of susceptible micro-organism is used for determining concentrations of this antibiotic in body fluids, the method is fraught with error. The same is also true when bacteriostatic tests are done. The figures obtained do not represent true values but rather qualitative instead of quantitative results. With this in mind, the following data are presented: When dogs and rabbits were injected with single doses of 20 or 40 mg. of aureomycin by the intramuscular route, concentrations of slightly over 1 microgram of the antibiotic per ml. were noted in the serum within one hour but not after that time. In a dog receiving 20 mg. of aureomycin per kg. of body weight twice a day for ten days, the antibiotic could be detected in the serum up until two and one-half hours after each injection. While the antibiotic was not observed in the spinal fluid, it did appear in quantity in the urine. When aureomycin was administered orally to human beings in doses of 500 mg. twice a day and 40 mg. every six hours by injection, concentrations of from 0.6 to 2.4 micrograms of the antibiotic per ml. were observed in the sera one hour after the injection was given. The antibiotic produces a greenish yellow discoloration of the urine, in which concentrations of from 40 to 360 micrograms per ml. have been observed.

Chloromycetin[44] appears promptly in the blood after the administration of a single oral dose or an intramuscular injection of this antibiotic. It also would appear that it is excreted fairly rapidly in the urine in which its recovery (as measured by biological tests) is fairly high. In experiments in which chloromycetin was administered to dogs over a period of 24 days by the oral or intramuscular route, concentrations of from 1 to 29 micrograms of chloromycetin per ml. of serum were noted two hours after treatment, and concentrations of 1 to 2 micrograms per ml. of serum, 18 hours after treatment. Concentrations of from 36 to 406 micrograms per ml. of urine were noted in these dogs. It was also deter-

mined that chloromycetin was bound to the proteins of the serum to the extent of about 45 per cent. In patients ill with typhoid fever,[50] and treated with initial daily doses of between 4 and 5 gm. of chloromycetin, concentrations of from 40 to 80 micrograms per ml. were noted in the serum within the first 24 hours of treatment. It was also observed that the concentration of chloromycetin in the spinal fluid was approximately half that noted in the blood.

TREATMENT OF EXPERIMENTAL INFECTIONS

Polymyxin has been shown to be an effective chemotherapeutic agent in the treatment of experimental infections in mice produced by K. pneumoniae, Type A (Friedlander's bacillus),[5, 11, 46] H. influenzae,[6] P. multocida,[46] and Shigella gallinarum.[46] In our laboratory it appeared to be from five to ten times more effective in the control of infections produced in mice by K. pneumoniae and H. influenzae than is streptomycin.

Chloromycetin has been shown to have a chemotherapeutic effect in experimental infections produced by rickettsia,[14, 21] K. pneumoniae, Type A,[44] Shigella paradysenteriae Sonne,[44] D. pneumoniae,[44] Strept. hemolyticus and Strept. viridans,[44] and certain viruses of the psittacosis group.[44] Wong and Cox[49] demonstrated that aureomycin is an effective chemotherapeutic agent in the treatment of experimental infections produced by various types of rickettsia. SubbaRow and his co-workers[24] have shown that this antibiotic cured experimental infections in mice produced by hemolytic streptococci, pneumococci, or K. pneumoniae, Type A. Heilman[25] has reported that aureomycin was effective against experimental infections produced by Borrelia novyi or Leptospira icterohemorrhagiae (see Tables 4, 5 and 6).

In tests made in our own laboratory of the comparative therapeutic effects of chloromycetin, aureomycin, polymyxin D, and penicillin in certain experimental infections in mice, the following results were obtained: As will be noted from a perusal of Table 4, in experimental infections in mice produced by the injection intraperitoneally of 10,000 M.L.D. of K. pneumoniae, Type A, aureomycin and chloromycetin showed essentially equal therapeutic activity. Both were about a hundred times less effective at the dosage levels employed than was polymyxin. As is shown in Table 5, in the treatment of experimental infections in mice produced by the intraperitoneal injection of 10,000 M.L.D. of Strept. hemolyticus (strain C203), aureomycin appeared to be about 25 times more effective than chloromycetin, and about ten times less effective than was crystalline penicillin G. When mice were infected with 10,000 M.L.D. of D. pneumoniae, Type I (strain SVI), and then treated (Table 6), aureomycin was over 40 times more effective as a therapeutic agent than was chloromycetin, and about five times less effective than was crystalline penicillin G. In these tests only an approximate comparison could be made between aureomycin and chloromycetin because of the relative insolubility of the latter compound. In making these studies of therapeutic effectiveness, the mice were treated by the subcutaneous route, immediately, at five hours, and then at 23 hours after they had been infected. They were observed for six days after therapy had been discontinued.

TREATMENT OF INFECTIONS IN HUMAN BEINGS

There can be no doubt as to the therapeutic effectiveness of polymyxin for the treatment of local and systemic infections produced in human beings by certain Gram-negative bacilli. Outstanding among the infections which have responded to treatment with this antibiotic have been those due to Ps. aeruginosa, K. pneumoniae, H. pertussis, H. influenzae, Type B, and E. coli. In severe instances of infection which were treated by the intramuscular injection of

TABLE 4.—*Comparison of the Effects of Aureomycin, Chloromycetin and Polymyxin D in Friedlander Infection in Mice*

Friedlander A—10,000 M.L.D. Injected I.P.—10 Mice Each Group

Dose	Per Cent Survival			
Gamma/Gram	Aureo.	Chloro.	Poly. D	Controls
80	80	90	....	....
25	10	10	....	....
8	0	0	....	....
4	....	....	80	....
1.25	....	....	90	....
0.4	....	....	50	....
0	....	....	....	0

(Drug Administered S.C., Stat., 5 and 23 Hours After Infection)

TABLE 5.—*Comparison of the Effects of Aureomycin, Chloromycetin and Penicillin G in Hemolytic Streptococcal Infection in Mice*

C203 Strain—10,000 M.L.D. Injected I.P.—10 Mice Each Group

Dose	Per Cent Survival			
Gamma/Gram	Aureo.	Chloro.	Peni.G	Controls
50	....	30	....	....
10	....	0	....	....
2	50	0	....	....
1	0	....	....	....
0.5	0	....	....	....
0.2	....	....	40	....
0.1	....	....	0	....
0.05	....	....	0	....
0	....	....	....	0

(Drug Administered S.C., Stat., 5½ and 23 Hours After Infection)

TABLE 6.—*A Comparison of the Effects of Aureomycin, Chloromycetin and Penicillin G in Experimental Pneumococcal Infections (SVI Type I Pneumococcus)*

10,000 M.L.D. Inocula. I.P.—10 Mice Each Group

Dose	Per Cent Survival			
Gamma/Gram	Aureo.	Chloro.	Peni.G	Controls
20	90	0	....	....
8	30	0	....	....
5	....	....	80	....
2	10	0	60	....
0.8	....	....	10	....
0	....	....	....	0

(Drug Administered S.C., Stat., 5 and 23 Hours After Infection)

polymyxin at three-hour intervals, the results frequently have been very satisfactory. As an example, the course of a patient deathly ill as a result of a systemic infection produced by Ps. aeruginosa will be outlined. This man had been treated with sulfadiazine, penicillin, and streptomycin without beneficial results. At the time therapy with polymyxin D was initiated, the patient was deeply jaundiced, there was consolidation of the left lung, a bacteriological culture of the blood was positive, and, in the opinion of several competent clinicians, he was moribund. The effect of treatment with polymyxin was more than dramatic, as the patient was well on the road to recovery within 24 hours after therapy was started.

The total daily dose of polymyxin D has been based upon 3 to 6 mg. of the antibiotic per kg. of body weight, this being split into six equal doses and given in a special buffer solution (pH 7.4) at intervals of four hours. It is indeed unfortunate that the toxicity (as will be described later) of the various specimens of polymyxin which have been tested to date is such as to preclude the general use of this antibiotic. However, it must be said that in severe instances of systemic or localized infections due to Ps. aeruginosa, K. pneumoniae, A. aerogenes, H. pertussis, etc., the authors would not hesitate to employ polymyxin D as a therapeutic agent in cases in which the dangers of the disease outweighed those of temporary renal damage. This antibiotic may be life-saving.

Chloromycetin has been shown to be a highly effective therapeutic agent in the treatment of epidemic typhus,[32] scrub typhus,[43] Rocky Mountain spotted fever, eastern variety,[33] and typhoid fever.[50] Payne and his associates[32] have reported that chloromycetin in doses of 10 mg. per kg. of body weight per day given by the intravenous route, or 15 mg. per kg. of body weight per day given by the oral route for a period of three days, was effective in the treatment of epidemic typhus fever. Smadel and coworkers[43] have described the treatment of scrub typhus with this antibiotic. In 25 patients with this disease, the administration of chloromycetin in varying doses brought about a prompt cure. Doses as small as 6.0 gm. of chloromycetin given for *one day* produced satisfactory responses. Pincoffs and his co-workers[13] have tested the effects of chloromycetin in 15 patients ill with Rocky Mountain spotted fever, eastern variety. Here again, excellent results were obtained in all patients who were treated. Finally, Woodward, Smadel, Ley, Green, and Manikas[50] have found that chloromycetin administered by mouth in initial doses of 50 mg. per kg. and continuing doses of 0.25 gm. every two hours until the temperature was normal, and then in the same dose every three or four hours for the ensuing five days, exerted a specific therapeutic effect in ten patients ill with early typhoid fever, all of whom had at least one blood culture positive for S. typhosa before treatment was started. The average time in which the temperature returned to normal in these ten patients was three and one-half days. As chloromycetin has been in short supply, the authors have had little clinical experience with this antibiotic. It would appear very clear, however, that it is an extremely effective antibiotic for the treatment of rickettsial diseases, its use in typhoid fever seems established, and from experimental observations *in vitro* and *in vivo* it is likely that it will prove to be an effective chemotherapeutic agent in infections produced by certain Gram-negative organisms and viral agents.

It has been reported[33, 36] that aureomycin appeared to be an effective chemotherapeutic agent in the treatment of Rocky Mountain spotted fever, eastern variety, certain urinary tract infections produced by E. coli, A. aerogenes, or Strept. fecalis, acute and subacute undulant fever, primary atypical pneumonia, and staphylococcal infections. Recently Braley and Sanders[7, 8] have stated that this antibiotic is valuable in the treatment of staphylococcal conjunctivitis and blepharitis, influenzal conjunctivitis, pneumococcal conjunctivitis, inclusion conjunctivitis, early epidemic keratoconjunctivitis, dendritic keratitis, vernal conjunctivitis, and Mooren's ulcer. The agent was without effect in Piranaud's conjunctivitis and in late cases of epidemic keratoconjunctivitis. Wright and his co-workers[51, 52] believe that aureomycin "is the treatment of choice in all cases of lymphogranuloma infection." They also recommend further study of the effect of the drug in granuloma inguinale because of three favorable results which were obtained with it in patients ill with this disease. The results relative to granuloma inguinale have been confirmed by Greenblatt and co-workers[23] who reported excellent results when this antibiotic was used in three cases in which the disease had proven resistant to treatment with streptomycin.

Finland and his associates[16, 22] have reported that aureomycin exerted a beneficial effect in certain coccal infections, although in gonococcal infections the results were inferior to those which could be expected with penicillin. In Salmonella infections, the results were equivocal, while in urinary tract infections the effects of therapy were good, except in patients whose infections were produced by P. vulgaris or Ps. aeruginosa. Spink and co-workers[45] have used aureomycin in patients ill with acute and chronic brucellosis produced by infection with Br. melitensis. They state that "the immediate therapeutic results have surpassed those obtained with any therapy, including a combination of streptomycin and sulfadiazine." Lennette, Meiklejohn, and Thelen[27] tested the effects of aureomycin given by mouth in the treatment of Q fever. Prompt response to therapy was noted in 14 patients acutely ill with this disease. In one patient, in whom the disease was present in a chronic form, the antibiotic seemed to be ineffective. O'Leary, Kierland, and Herrell[29] have reported that "aureomycin appears to have some antispirochetal activity when administered by the oral route." This observation upon the effects was noted when the antibiotic was used in the treatment of two patients who had early syphilis.

To these observations may be added a report on

further clinical experiences with aureomycin at Johns Hopkins Hospital. Sixteen patients ill with Rocky Mountain spotted fever, eastern variety, with the disease proven by serological methods in 13 of them, were treated with aureomycin. The details of this clinical experience have been recently described by Ross and co-workers.[35] The results obtained were excellent in all instances. Treatment with aureomycin was begun an average of 4.5 days after onset of symptoms. The temperature returned to normal in an average of 2.3 days after treatment was started. There were no complications. The average period of hospital stay was eight days. Experience with one patient is charted in Chart 1. One patient who was severely ill with Brill's disease was treated with prompt and excellent results, as was also one patient suffering from acute Q fever.

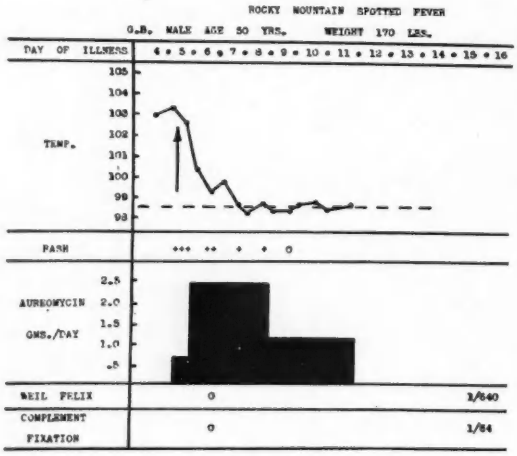

Chart 1

In 17 cases in which, by all available methods of exclusion, a diagnosis of primary atypical pneumonia was made, the patients were treated with aureomycin with excellent results. In 13 cases the temperature of the patient was normal in 24 hours, and in three within 48 hours. In one case in which four lobes were involved in the disease process, the patient was afebrile in 72 hours. All patients experienced prompt symptomatic relief and the pneumonic processes in the lungs cleared up rapidly after treatment was initiated. The details of this clinical experience are being reported by Schoenbach and Bryer.[39] Experience in one case is summarized in Chart 2.

Five patients ill with acute or subacute brucellosis, in all of whom positive blood cultures were obtained, were treated with aureomycin. In four of these patients the infection was due to Br. suis, while in the other Br. abortus was recovered from the blood. All had symptoms typical of the disease and four had enlarged spleens. The titer of antibody

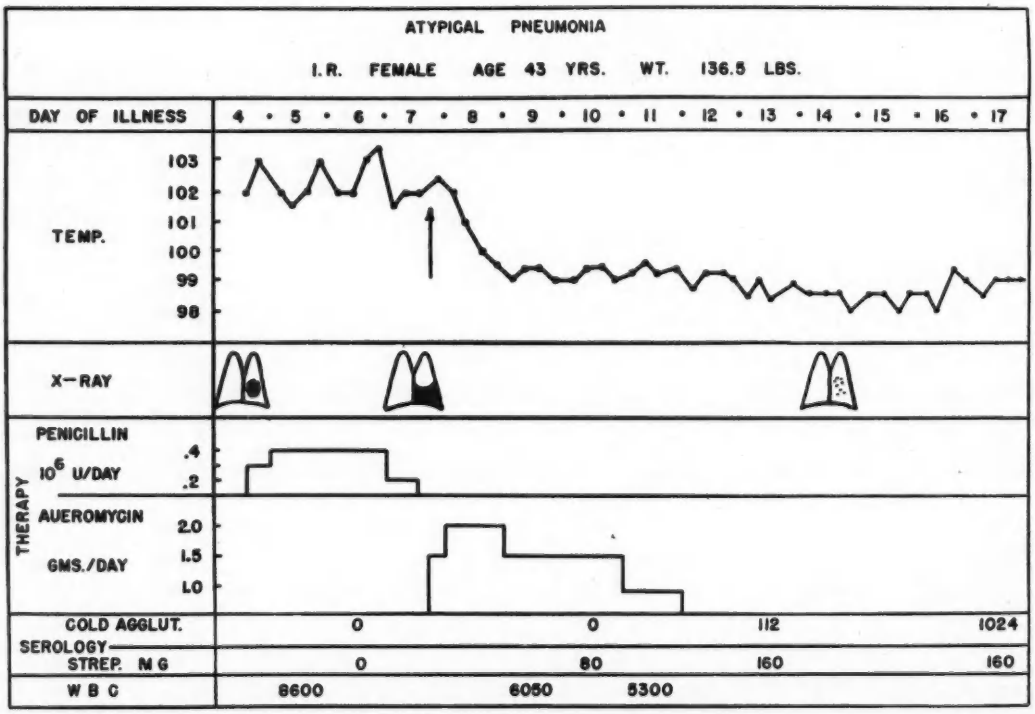

Chart 2

for the specific strain of the Brucella group with which they were infected was high in the serum of each patient. One had not been cured by previous treatment with sulfadiazine, streptomycin and sulfadiazine, and polymyxin, while another had had an ineffectual course of streptomycin and sulfadiazine. In all five patients there was dramatic clinical response to the administration of aureomycin, with the temperature falling to normal within 72 hours and with a progressive remission of all symptoms and signs. Treatment was carried out over a 14-day period. These patients have been followed from three to seven months. All have gained weight consistently and none has shown symptoms or signs of a return of the disease. The details of this experience are being reported by Bryer and his associates.[13] Experience in one case is shown in Chart 3.

Six patients with various forms of tuberculosis were treated with aureomycin. In three, who had tuberculous meningitis, the antibiotic was not effective. In the case of a 12-year-old Negro girl who had had five scrofulous sinuses in the neck for seven years, from each of which tubercle bacilli had been repeatedly isolated in guinea pigs, the administration of aureomycin for six weeks resulted in the closure of all sinuses a week after treatment had been started and, to date, there has been no recurrence of the disease. The fifth patient had advanced tuberculosis of the renal tract with marked involvement of the bladder. One kidney had been removed because of the infection. This patient has been under treatment for three months and has had a remission of the symptoms and signs of the disease. Treatment is being continued, however. A sixth patient ill with cavitating tuberculosis was treated for two weeks with aureomycin without evidence of clinical improvement. At the time of this writing it must be made very clear that no claims are being made for the therapeutic use of aureomycin in tuberculosis. This is merely a report of observations.

Five patients with typhoid fever were treated with aureomycin. While all recovered and in all cases blood and stool cultures became negative soon after antibiotic therapy had been instituted, the results as far as the decline in the fever and the general improvement of the patient were concerned were equivocal and might well have been due to chance. Chloromycetin would appear to be definitely superior to aureomycin for the treatment of this disease.

Eighteen patients with serious and complicated infections of the urinary tract were treated with aureomycin. All had previously received sulfonamides, penicillin or streptomycin, or a combination of them. All had anatomical or functional abnormalities of the urinary tract. The infecting organisms were E. coli, A. aerogenes, or Strept. fecalis or a mixture of two or more of these micro-organisms. The immediate effects from therapy were satisfactory in 17 and fair in one of these patients. It remains to be seen what the long time results

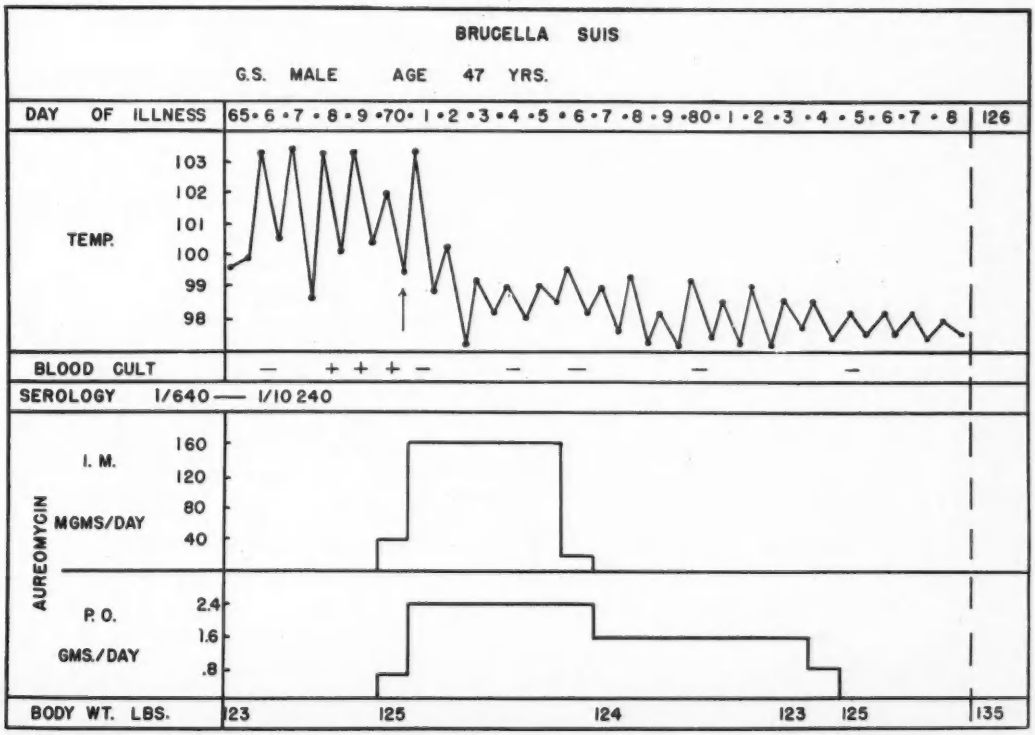

Chart 3

will be. Aureomycin is ineffective in urinary tract infection with Ps. aeruginosa or P. vulgaris.

Eight patients ill with moderate to severe infection with Staph. aureus hemolyticus, in two of whom staphylococcal bacteremia was present, were treated with aureomycin. In several of these patients antecedent therapy with sulfadiazine and/or penicillin had been unsuccessful. In seven of the eight patients prompt and satisfactory response to therapy was noted. In the eighth, an infant whose initial infection was staphylococcal pyodermia, extensive signs of pulmonary involvement were present despite continuous therapy with penicillin for a period of more than two months. When treatment with aureomycin was initiated, the pulmonary signs cleared rapidly except for one small area. After two weeks of therapy with aureomycin, material for culture was obtained from this area by bronchoscopic examination, and a strain of Staph. aureus hemolyticus, which was resistant *in vitro* to more than 100 micrograms of aureomycin per ml., was isolated. This patient now is clinically well. These experiences are being reported by Chandler, Schoenbach, and Bryer.[15]

Whenever a new antibiotic is being tested clinically, a number of patients with infections for which there is no experimental evidence for the use of the antibiotic must be treated with it, if only to maintain harmony in the society of physicians. Certain of these patients which we will place in the category of "miscellaneous infections" will be discussed. Among the patients with miscellaneous infections which experimental evidence indicated might be abated by use of aureomycin, were the following: One patient ill with meningitis produced by Strept. fecalis, was promptly cured by the oral administration of aureomycin. One patient ill with pneumococcal meningitis produced by D. pneumoniae, Type 6, had been treated with sulfadiazine and penicillin, and the infecting organism had become resistant to these therapeutic agents. Cultures of the spinal fluid were abundantly positive for D. pneumoniae before therapy with aureomycin was initiated. Recovery was prompt after this antibiotic had been administered. One patient, a child who had subacute bacterial endocarditis, with four cultures positive for Strept. fecalis, was treated with aureomycin by mouth for a period of two weeks with excellent results. Four months later this child seemed to be in good health. Another patient with the same disease, with blood cultures repeatedly positive for Strept. fecalis, was treated with excellent initial results insofar as abatement of fever and other signs and symptoms are concerned. However, the follow-up period is not yet long enough for the patient to be considered cured. Two patients who had brain abscesses, one due to Staph. aureus hemolyticus and the other to E. coli, have been treated with satisfactory results. Two patients ill with generalized peritonitis, with the infection in one case produced by E. coli and Strept. fecalis, and by Strept. fecalis in the other, have been successfully treated with aureomycin. In both instances the response to therapy was dramatic, and in both aureomycin was used after surgical therapy had not brought about the desired results. Aureomycin was given to two patients having definite signs of localized postoperative infections. In one the infection followed resection of a carcinoma of the colon with an end-to-end anastomosis of the bowel which broke down and resulted in a fecal sinus; in the other there was a persistent purulent abdominal sinus following drainage of a pelvic abscess. In both there was prompt remission of signs and symptoms together with a closure of the sinuses following therapy with aureomycin. In both instances the infecting organisms were E. coli and Strept. fecalis. Two patients ill with whooping cough did not respond to treatment with aureomycin. One patient each with polioencephalitis, noma, and pancreatic necrosis with secondary infection have been treated without results. The same is true of four patients ill with erythema multiforme.

ADMINISTRATION AND DOSAGE

Up to the present, oral administration is the method of choice for aureomycin. No satisfactory preparation for general intravenous use has been developed so far. The antibiotic, as supplied, is a hydrochloride salt, and when this is administered intramuscularly it produces pain due to the acidity of the product. This has militated against its use by this route. It is too early in the history of aureomycin to establish accurate dosage schedules for the administration of this antibiotic. It is likely that the dosage schedules recommended herein will eventually be proven to have been excessive. However, they have been effective. In severely ill patients who are being treated orally, the total daily dose of aureomycin should be based on 60 mg. per kg. of body weight. Initial "priming" doses equivalent to one-sixth of the total daily dose should be given to seriously ill patients at hourly intervals for three doses. Then one-sixth of the estimated daily dose should be given at intervals of four hours until the temperature has been normal for 24 hours. At this time the basis for the total daily dose should be reduced by one-half or to 30 mg. per kg. of body weight. This should be divided into four parts and given at intervals of six hours until the infection is eliminated. In moderately severe infections the total daily dose should be based on 30 mg. per kg. of body weight, this to be divided into four or six equal parts and given at intervals of six to four hours until the infection is under control. As approved derivatives of aureomycin for parenteral injection are not available, use of the drug by this route will not be discussed.

CLINICAL TOXICITY

Polymyxin, being a polypeptide or a mixture of polypeptides, should not produce toxic reactions as the result of the sensitization of the patient to the antibiotic. This has been true in the author's experience thus far. All specimens of this antibiotic which we have tested have produced varying degrees of renal tubular dysfunction. In the mildest form it

appears as a fixation of the specific gravity of the urine, while in severe forms, oliguria with albumin, casts, erythrocytes and leukocytes in the urine, and elevated non-protein-nitrogen levels and depressed renal function may occur. These latter reactions sometimes become very disturbing and it is because of them that the general use of polymyxin seems contraindicated. Histamine-like reactions, hypasthesias, and fever have been noted in the course of polymyxin therapy, but these reactions would appear to be due to impurities in the specimens of polymyxin which were being used rather than to the antibiotic itself.

Neither aureomycin nor chloromycetin has shown significant evidence of clinical toxicity up to the present. This is extremely interesting, because, despite the fact that both of these products are derived from members of the family of Streptomyces, reports of sensitization or other toxic reactions have not been made, and this in face of the fact that several hundred patients have been treated with these antibiotics. Some nausea has been reported by patients receiving aureomycin, but this generally can be controlled by the administration of preparations containing aluminum hydroxide. The passage of two or three bulky stools per day is frequently reported by patients who are taking aureomycin. This change in the stool is apparently due to an alteration in, or wiping out of, the normal bacterial flow of the large bowel. As this may interfere with the synthesis of essential food elements, it may be advisable to administer supplementary vitamins to patients who are receiving aureomycin for periods longer than a week.

615 N. Wolfe, Baltimore.

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Human Psittacosis Cured by Penicillin Therapy

ALFRED F. GOGGIO, M.D., *Berkeley*

SUMMARY

A number of recent reports in the literature have told of cure of psittacosis in man following enormous doses of penicillin in the early stages of the disease. In most of these cases, however, the infection was experimentally induced in laboratory studies. Given late and in inadequate amounts, penicillin apparently has no beneficial effect.

With a means of treatment at hand, and effective if started early, careful analysis of all cases of "atypical pneumonia" is indicated with a view to determining if the infecting agent might not be the psittacosis virus. A history of contact with birds or bird droppings should be sought in all cases of "atypical pneumonia."

A case is reported in which the patient, because of contact with birds, was suspected early of having psittacosis. No benefit was noted following therapy with 100,000 units of penicillin every three hours for one day, but rapid recovery ensued when the dose was doubled.

THE high incidence in recent years of so-called "atypical pneumonias" with the implied inability to demonstrate or apply specific therapy for the causative agent in most cases, is accompanied by several unfortunate tendencies. There is the temptation incorrectly to consider all such cases of atypical pneumonia as belonging to a single disease entity; there is not enough concern at failure to demonstrate a causative agent in any given case; the lack of applicable specific therapy is too readily presumed. One must be on guard to avoid confusing with "primary atypical pneumonia of unknown cause" not only the unusual varieties of bacterial pneumonias but also the non-bacterial pneumonias in which the infecting agent is known, for included in these latter two groups are pneumonias in which specific therapy is possible. Psittacotic, or ornithotic pneumonia now appears to be one of these.

The ubiquity of the infective agent of psittacosis, one of the largest of the known viruses, has been established. Human infections have been traced not only to the psittacine birds, parrots and parakeets, but also to canaries, finches, petrels, chickens and pigeons. As stressed by Meyer,[6] who for this reason favors the term ornithosis over the narrower psittacosis, the bird reservoir of infection is large and diffuse; and Smadel[9] has observed that the incidence of psittacosis in humans having "atypical pneumonia" is greater than is generally recognized.

The diagnosis of psittacosis is seldom made early in the course of the disease because it depends for its confirmation upon procedures carried out in very few laboratories—the isolation of the virus from the sputum or blood of the patient through the inoculation of mice or other suitable animals, or the demonstration of a rising titre in the patient's blood of complement-fixing antibodies for psittacosis antigen. Early diagnosis is therefore presumptive. In all cases of "atypical pneumonia," a history of contact with birds or bird droppings should be sought; onset with severe headache, fever, toxicity, gastro-intestinal symptoms and non-productive cough, the presence of a normal respiratory rate, relatively slow pulse rate, absence of classical signs of pneumonia with evidence of consolidation by x-ray, and a relatively normal leukocyte count, may be suggestive.

The basis for the successful specific therapy of psittacosis is found in the experimental work of Heilman and Herrell,[4] who in 1944 reported that penicillin in enormous dosage given soon after inoculation with the psittacosis virus cured the disease in mice. Bedson and May,[1] in England, similarly demonstrated that psittacosis virus is definitely susceptible to penicillin when in the tissues of the mouse. The amount of penicillin required to keep in check infection with this virus in the mouse to the extent of making the infection subclinical was found, however, to be very great; calculation from mouse to man would approximate 11,000,000 units for a human.

Meyer and Eddie[6] also stress the effectiveness of penicillin therapy early and in large dosage in experimental infections in mice and rice-birds. As to the sulfonamide drugs, although Early and Morgan[2] demonstrated that sulfadiazine therapy was definitely effective, although less so than penicillin, in experimental infections of mice by one strain of psittacosis virus (strain 6 BC), earlier works in animals and in human cases failed to establish sulfonamide drugs as effective agents in this disease. Streptomycin therapy as reported by these same workers was completely ineffective, and the author knows of no evidence contrary to this finding.

Reports of penicillin therapy of cases of psittacosis in man, with a few notable exceptions, are somewhat disappointing. Therapeutic effectiveness of penicillin in humans with psittacosis is reported by Turgasen,[10] by Flippin, Gaydosh and Fittipoldi,[3] by Parker,[7] and by Kirkwood.[5] It might be noted, however, that the penicillin dosage employed in these

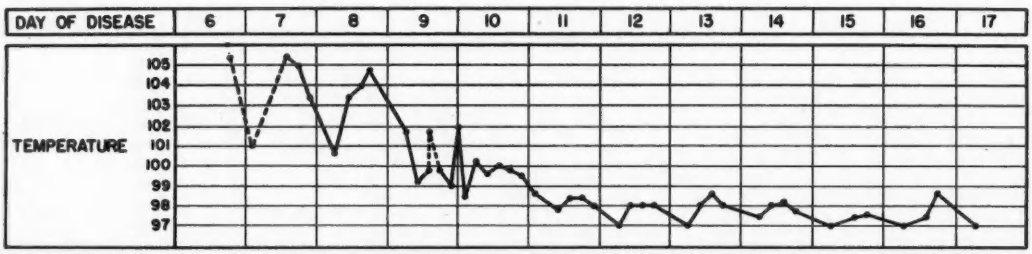
cases was very much less than that which would be expected to be effective on the basis of the experimental work to which reference has been made. Moreover, often the penicillin was administered quite late in the course of the disease. Indeed, Parker[7] in his report of two cases of psittacosis in man, concludes in this vein: that not much is to be expected from the dosage of penicillin ordinarily used in reported cases, and that when the temperature falls by lysis in a self-limited disease of two to four weeks' duration, it is difficult to conclude that the penicillin had much to do with the result obtained. Penicillin therapy of humans infected in laboratory with psittacosis virus, as reported by Meyer and Eddie,[6] where the diagnosis and therapy were established early and the dosage of penicillin was relatively large, presents a much more striking picture of the efficacy of such therapy. One such laboratory infection in a man is reported by Rosebury, Ellingson, and Meiklejohn.[8] In that case, penicillin and sulfadiazine in combination were strikingly effective. The infection in that case was known to be caused by the 6 BC strain of psittacosis virus which had previously been demonstrated experimentally by Early and Morgan[2] to be susceptible to sulfadiazine, although in lesser degree than to penicillin.

More closely than in any other reported case of penicillin therapy of non-experimental psittacosis in a human, the circumstances surrounding treatment in the following case report are believed to approach those prevailing in the treatment of laboratory infections. The diagnosis was made and penicillin therapy begun reasonably early in the course of the disease; the dosage of penicillin was very large and the response appeared dramatic (see Figure 1).

CASE REPORT

The patient, a 27-year-old housewife, complained of recurring chills and high fever accompanied by marked gastric and intestinal flatulence and some nausea. She said that five days previously she had had so severe a headache that she had had to go to bed. She took two laxative tablets and shortly thereafter severe diarrhea developed. That night she had shaking chills and fever. In the morning she felt well enough to go shopping, but had frequent watery bowel movements. That evening chills and fever recurred. The following day, a physician prescribed a bismuth compound, empirin and codeine, and the diarrhea and cramps were brought under control. Shaking chills and fever continued, however, with apparent fall of temperature in the mornings to approximately normal. Very troublesome gastric and intestinal flatulence developed and the patient felt very ill and weak. She admitted only a mild infrequent, nonproductive cough. The evening prior to admission to hospital, the temperature was 105.4° F.

Upon physical examination at home it was noted that the patient was obese and appeared to be about the stated age. The skin was warm, moist, and slightly flushed. The patient



VIRUS IN SPUTUM		+										
VIRUS IN BLOOD		−										
COMP. FIXATION		++++ 1/16									++++ 1/64	
LEUKOCYTE COUNT	9800	6500		9100								
NEUTROPHILES	89	72		83								
STABS	37	2		7								
EOSINOPHILES		1										
MONOCYTES	1	1		4								
LYMPHOCYTES	10	26		13								

Figure 1.—Graph showing clinical course, pertinent laboratory findings and therapy.

complained of being "choked with gas." There was slight nasal congestion and injection of the fauces. No rigidity of the neck was noted. There were a few crepitant rales at the base of the left lung, but no evidence of consolidation was present. The heart was not demonstrably enlarged, and the pulse was regular at the rate of 100 per minute. Blood pressure was 98 mm. of mercury systolic and 60 diastolic. The abdomen was soft, with slight suprapubic tenderness. There was moderate gaseous distention. The spleen and liver were not palpated. Reflexes were not remarkable; the Kernig sign was negative. The lymph nodes were not remarkable. Leukocytes numbered 9,800.

It was felt that the patient had pneumonia at the left base, but the minimal findings and minimal pneumonic symptoms, the six-day history of distress, the predominance of gastro-intestinal symptoms and a very high remittent fever, were puzzling. In view of the presence of a cage of two canaries in the bedroom, inquiry was made concerning exposure to parrots and other birds. It was found that some two and one-half weeks before, the patient had purchased a canary from a pet shop, where she had played with a parrot. A tentative diagnosis of psittacosis was made and the patient was given 300,000 units of penicillin in oil intramuscularly and was admitted to hospital the following morning.

On the day of admission, the pneumonic findings in the left base were much more definite. The cough was more severe and was becoming productive of thick, glary, treacle-like sputum. Examination of the blood on the day of admission showed hemoglobin value of 13.7 gm. per 100 cc., erythrocytes numbering 4,440,000 and leukocytes 6,500, with neutrophils 72 per cent, including 2 stabs, eosinophils 1 per cent, lymphocytes 26 per cent, monocytes 1 per cent. Specific gravity of the urine was 1.006; it was acid and contained a trace of albumin but no sugar or acetone. The blood sedimentation rate (Wintrobe) was 45 mm. per hour.

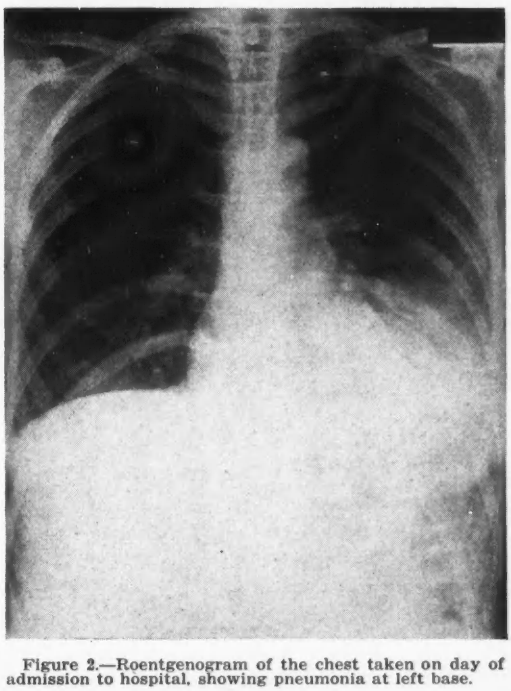


Figure 2.—Roentgenogram of the chest taken on day of admission to hospital, showing pneumonia at left base.

A roentgenogram of the chest showed an irregular area of consolidation at the left lower lobe; the left leaf of the diaphragm was obscured; the lung fields were otherwise clear (see Figure 2). In addition to the usual laboratory studies, blood and sputum were sent to the California State Virus Laboratory for psittacosis studies.

In the hospital, the patient was continued on penicillin therapy, 100,000 units every three hours. The temperature, pulse, respiration and medication are shown in Figure 1. There were sharp rises in temperature in the evening of the first two days to 105° F. and above, with marked toxicity, sometimes feeble pulse and cyanosis of the extremities at the high temperatures. Penicillin dosage was raised to 200,000 units every three hours on the second hospital day. On the third day the patient began to improve rapidly, the cough began to diminish and the sputum became reddish in color, then definitely blood-stained. By the fifth hospital day the temperature returned to normal and remained so, and the signs of consolidation began to clear. On the sixth day, report was received of the growth of psittacosis virus in both mice and cotton rats which had been inoculated with the patient's sputum, and of the presence of a good complement fixation titre for psittacosis in the blood. Another roentgenogram of the chest taken on the eighth day showed only a slight amount of abnormal density remaining in the lung. Blood taken the ninth day showed a rise in complement fixation titre for psittacosis. The patient was discharged on the eleventh hospital day, feeling well, with lungs essentially clear to ausculation.

As soon as the positive laboratory findings became known, the city and state health authorities went into action. The patient's three canaries were sacrificed and examined and although one canary, which had been in the patient's possession for five years, had an enlarged spleen, no psittacosis virus could be isolated from the organs of any of the birds. The pet shop the patient had visited was immediately quarantined. Inquiry disclosed that the patient had been there at least three times during the week in which she had purchased the canary. Blood was taken from the parrot and from five parakeets (a sample of the 14 parakeets in the store). Blood from two of these parakeets showed positive complement fixation titres for psittacosis, but although preparations from the spleens of all five parakeets and the livers of two of them were injected into mice, no virus could be isolated.

In this case, several points appear to be noteworthy, Living psittacosis virus was demonstrated in sputum obtained from the patient almost 24 hours after 300,000 units of penicillin in oil had been given intramuscularly, and six days after the apparent onset of the disease; virus was not demonstrated in the blood obtained at about the same time. Although 300,000 units of penicillin in wax and oil, followed within 18 hours by the institution of a dosage of penicillin of 100,000 units in aqueous solution every three hours, did not appear to produce any marked amelioration in the patient's condition, an increase of dosage to 200,000 units every three hours was closely followed by dramatic improvement. This was many times the dosage previously reported in human cases and approached the dosage used in experimental infections in mice. This high dosage was maintained for perhaps an unnecessarily long

period, but was accompanied by prompt and complete recovery without any indication of relapse of the infection. Epidemiological studies failed to demonstrate conclusively the source of the patient's infection; the evidence would indicate that the patient's canaries could be exonerated and that the source of infection was probably infected droppings present in the pet shop from birds other than those sacrificed and tested by animal inoculation. It is believed that this case furnishes strong evidence that penicillin in very large dosage is curative of psittacosis in man.

2490 Channing Way.

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Tuberculosis in Childhood

LLOYD B. DICKEY, M.D., *San Francisco*

SUMMARY

Those physicians who deal with children have much to contribute toward case finding in tuberculosis among these patients as well as adults. The tuberculin test is the most accurate weapon at hand. Contacts other than the parents should be looked for. Symptoms, beside fever, to be noted are eye and skin complaints. In the physical examination the chest is relatively unimportant as compared to the eye, the skin, the lymphatic and skeletal systems. In the roentgenographic examination, epituberculosis and atelectasis should be differentiated. When stomach washings are necessary for the diagnosis, the tuberculin test on the guinea-pig should not be forgotten. Careful laboratory studies will clear up roentgenographic confusion.

In the treatment, removal of contact is essential, and often all that is necessary, but other factors should be considered. Of the more common complications, atelectasis, bronchiectasis, and cavitation or reinfection, may be treated surgically with all the accepted methods except thoracoplasty. Heliotherapy should not be forgotten in bone and joint tuberculosis. It is to be hoped that BCG will prove efficacious in vaccination, but published reports are not scientifically convincing. It destroys the value of the tuberculin test where used, and it should never be substituted for removal of contact as a prophylactic measure.

THE pediatrician and the general practitioner have a peculiar advantage—or had, at least until recently—in the study of tuberculosis. The pediatrician, who is the general practitioner with practice limited to a certain age group, sees tuberculosis in the full gamut from exposure through the incubation period into the primary infection, and from there into quiescence or complications, to reinfection, arrest, or death. He is more apt to see the story of tuberculosis in its entirety, although this statement was truer in the past than it will be in the future. As a result of efforts to prevent exposure the story is often being postponed until more of it is finished in the older age groups, and even the beginning is more often not seen until adult life is reached. But to all who still doubt that tuberculosis in all its manifest forms is common in children, an invitation is extended to make rounds on a tuberculosis ward for children at the San Francisco Hospital.

What has the pediatrician been able to contribute to the study of tuberculosis from his vantage point, and what does he look for and emphasize about the disease? In other words, what may he teach others?

Assume that the story begins with that test which originated in pediatric practice, the tuberculin, one of the most accurate biological tests known to medical science when properly evaluated. It has suffered much from misinterpretation by those not using it often, but it still gives much more accurate information than the Wassermann test, the sedimentation rate, or the leukocyte and differential blood counts. It might be said to be even more accurate in diagnosis than the finding of acid-fast organisms, which in some locations in the body may not be tubercle bacilli. What enthusiasm there would be for a comparable skin test for the infection of rheumatic fever!

Those who belittle the tuberculin test should remember that as infection in childhood becomes less prevalent, a negative reaction to the test becomes more significant. It is safe to say that if the test is properly made upon a patient who is not suffering or convalescing from another communicable disease and who is not already overwhelmed and moribund from obvious tuberculosis, a negative reaction will rule out tuberculous infection of any type and at any site. A "false negative" will not be seen by the average physician in a lifetime. The tuberculin must, however, be gotten into the skin by either the Mantoux or Craig test (and be given in doses up to 1 mgm., if the Mantoux test is used) before the result can be called negative. A patch test, which a school child may secretly remove soon after application and replace a few minutes before inspection, should, if the reaction is negative, be followed by intradermal testing.

Assume that in routine office or clinic practice, a tuberculin test is positive: It means, in addition to his own infection, that active tuberculous disease has at some time been in that child's environment. The test therefore becomes a potent means of case finding, and, if the child has not already been reported because of his contacts, a much more accurate means of case finding than the roentgenogram. The pediatrician becomes, if he has a suspicious mind, one of the most valuable case finders in the campaign against tuberculosis. Parents and older siblings come to mind first as a source of the disease, but those who work with children should not forget

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From the Department of Pediatrics, Stanford University School of Medicine, San Francisco.

the school-teacher, the nurse, permanent or casual, the maid in the house, the cook, playmates, especially older children, the grandparents with the chronic cough of old age, and, in clinic practice, the midwife. Raw milk, occasionally taken as a special treat when visiting country relatives, must be remembered in certain areas.

In asking about symptoms, inquiry should be made as to bouts of unexplained fever or sores that have healed slowly and with thin but ragged scarring. Children are apt to have primary skin tuberculosis caused by being bitten or kissed by someone with active infection or by slight injuries coming into contact with infected material. Inquiry should be made about sore eyes and conjunctivitis, about nodules over the skin, and transient rashes of all sorts not readily explainable.

What may be found in the physical examination that may not be seen often in an adult? Usually nothing in the chest, although signs of fluid may be present, and in any age classical signs of infiltration or cavity may be found. The pediatrician, having popularized D'Espine's sign, has now consigned it to the limbo it deserves, and interns may now be found who are even unfamiliar with the term. Negative findings in an examination of the chest are relatively unimportant, and search should be made for active phlyctenulosis or the scarring therefrom, for erythema nodosum over shins, thighs, arms, forearms, and occasionally forehead or chin, for morbilliform or other rashes that cannot be fitted into a nomenclature. Enlarged lymph nodes must be looked for and the surface of the tonsils inspected. A search should be made for orthopedic deformities. An enlargement of the wrist or a buckle on the spine may be caused by tuberculosis, though the roentgenogram of the chest be as clear as that of a normal infant.

In the evaluation of a case record, roentgenograms of the chest usually come next in sequence. Often the trilogy of primary focus, lymphangitis and lymphadenopathy may be seen, and occasionally thickened pleura. Mention will be made of only the shadows commonly called the epituberculous lesion. Of these there are two types. One is the true epituberculous lesion of allergic reaction with tubercle in the center and edema or cellular elements surrounding it. The other resembles this only in roentgenographic shadow, as it is a collapse due to pressure of a node on a bronchus. It is the more serious lesion of the two, as it may lead to bronchiectasis, and often does. In addition, all types of shadows seen in adults may be seen in infants and children and with the same significance.

Next comes the search for the tubercle bacillus. Stomach washing is now almost routine in all cases of tuberculosis, sometimes during the course of the disease, even in adults. Points to be emphasized here are that the contents should be taken early in the morning before the patient arises and before the aroma of food may empty the stomach. The contents, if acid, should be inoculated into a guinea-pig at once, but otherwise neutralized if three-day pooling is to be done. If the guinea-pig is given a tuberculin test on the day of inoculation and the reaction is negative, it may be tested again on the eighth day. If the stomach washings contained tubercle bacilli, the reaction to the second test will be positive in 95 per cent of cases. This simple test, not as widely used as it deserves to be, will save about a month's time in gathering the information sought.

Of the numerous diseases simulating tuberculosis in childhood, chronic sinusitis with its accompanying bronchitis, coccidioidomycosis, pneumonias, (lobar, bronchial, and Loeffler's), and cystic fibrosis of the pancreas are the ones commonly confused with it. Atelectasis either separately or as part of the disease may complicate the picture. Usually, the confusion is only roentgenographic, as careful history and laboratory examinations will differentiate these from tuberculosis. There are some rarer diseases to be kept in mind, such as Monilia infections, rheumatic lung involvement, tumors and cysts, histoplasmosis, toxoplasmosis, lung abscess and sarcoidosis.

The most important item in the treatment of tuberculosis in childhood is not controversial. It is the complete and absolute removal from contact, and the item need not be elaborated, except to say that it is the ideal of both active and prophylactic treatment.

There is a tendency to minimize the importance of, or to abolish altogether, rest in bed in the treatment of the primary infection. It is, indeed, usually a self-limited infectious disease, but not always. The same may be said of measles, yet nobody would think of advising that children with measles remain ambulant while febrile. The author advises rest in bed during the primary infection as long as there are symptoms attributable to it, while any organisms are found in secretions or body fluids, and until the sedimentation rate has returned to normal. If it be an error to advise this, it is an error on the safe side.

Attention to the diet is especially important in tuberculous children because of the growth factor which is not present in adults. Special attention should be paid to adequate protein, vitamin, and mineral salt intake to replenish the loss by disease, as well as to supply the needs for normal growth.

Of the complications of childhood infection one of the more common and more important is atelectasis from pressure of enlarged lymph nodes, or a bronchial lesion and subsequent bronchiectasis. Wallgren called attention to this 20 years ago, but it has not received much attention in the literature. In the author's experience, bronchiectasis in children, if unilateral and especially if apical, is more apt to be due to tuberculosis than to any other cause. Exudative tuberculosis, with pleural fluid, or cavitation is seen at all ages in younger patients, and is common in later childhood. The study of these

types in children called attention to the frequency of basilar tuberculosis at all ages, and led to the demise of the belief that basilar shadows were less apt to be caused by tuberculosis than by something else.

The treatment of bronchiectasis due to tuberculosis and of cavitation is primarily surgical. Children of all ages stand operation well. In pneumothorax, space fillings, pneumoperitoneum, lobectomy or pneumonectomy, childhood is no contraindication. With the exception of thoracoplasty, which is deforming in children, surgical procedures are withstood as well as, if not better than, by adults. Because adolescents may be uncooperative about rest, they are best treated under supervision in sanatoria. A complete plan of treatment should be outlined, and complications anticipated.

Bone and joint tuberculosis should be treated by the orthopedist and pediatrician together. Nearly all patients will be benefited by heliotherapy properly applied, and when usable it considerably hastens the cure. It is a much neglected form of treatment, but the evidence of the benefits is overwhelming.

The treatment of the miliary and meningitic forms by streptomycin has given the very first ray of hope in these forms of the disease; for the first time in history, cures have been reported.

No general discussion of tuberculosis in childhood would be complete without at least a mention of BCG as a means of prophylaxis. It is hoped of course that the optimistic claims for this product will be substantiated. After a quarter century of use of the vaccine, its effectiveness is still controversial, due mostly to the carelessly controlled projects both in Europe and America. In the only reported carefully scientifically controlled series,[1] with alternate cases as controls, no appreciable difference between the two groups was noted. Some of the other studies may have been controlled in this way, but the published reports have not so stated. In reports on the use of BCG the control methods should be exactly stated and the method of selection of controls elaborated upon. The use of BCG almost completely destroys the value of the tuberculin test in case finding, as its use is usually confined to the heavily infected groups where case finding is most important. BCG vaccination should never be considered a substitute for removal of contact.

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The Significance of "Albuminuria" (Proteinuria)

DAVID A. RYTAND, M.D., *San Francisco*

SUMMARY

"Albuminuria" is an inadequate term; proteins other than albumin commonly appear in the urine.

Proteinuria seems to depend upon failure of the tubules to reabsorb protein which has filtered through glomeruli. Its occurrence may be the result of abnormal plasma proteins, glomeruli or tubules. Proteinuria need not always be the result of a renal lesion, but may actually cause one.

When proteinuria is discovered, it should arouse curiosity about the patient in general, not merely about his kidneys. Other clinical information is needed in order that treatment be directed appropriately.

THE heat and acetic acid test for "albumin" in the urine has now been in use for two and one-half centuries; particularly since the reports of Richard Bright over 100 years ago, a positive reaction to the test has generally been considered indicative of kidney disease and is too often regarded as evidence of nephritis. Actually, "albuminuria" is found in a great variety of conditions, both with and without anatomic renal abnormalities.

We are just coming to realize the qualitative as well as quantitative limitations of this remarkably ancient method of urinalysis. In the first place, albumin is not the only protein which will precipitate from acid urine under the influence of heat; so will the several globulins normally present in the plasma, as well as hemoglobin and Bence-Jones protein which are occasional abnormalities. Even when albumin is truly present, and especially when it is in large quantities, the normal globulins also escape into the urine.[20] Perhaps the urinary loss of complement and of gamma globulin with its antibodies may be related to the well-known susceptibility to infection of individuals with the nephrotic syndrome.

The fundamental mechanisms responsible for proteinuria are not yet fully understood. It was made clear by Bieter[6] some years ago that certain methods which produced proteinuria in fish possessing glomeruli failed completely to do so in species in which the kidneys were aglomerular; protein must pass via the glomerular filtrate before it appears in the urine. On the other hand, glomerular filtrate has been regarded as protein-free in the absence of glomerular injury. Normal urine is also apparently free from protein until more sensitive tests are employed, whereupon it is found that even normal individuals excrete protein (at a rate of less than 0.1 gm. daily). There is probably no fluid in the body which is entirely free from protein, and more recent studies [8, 22, 28, 32, 33] have in fact succeeded in demonstrating the presence of protein in mammalian glomerular filtrate. Assuming[13] even as little as 10 mgm. of protein per 100 cc., the daily production of 180 liters of glomerular filtrate should contain 18 gm. of protein. More than 17.9 gm. has disappeared before the urine is completely elaborated, and this has almost surely been reabsorbed by the renal tubule cells.

Proteinuria, then, could occur with normal glomeruli whenever the tubules are unable completely to reabsorb the proteins of the glomerular filtrate. The tubular load would be greater if more protein filtered past the glomeruli; this occurs with normal plasma proteins and diseased glomeruli, but could also result even with normal glomeruli if the plasma contained proteins with physicochemical properties (size and shape in particular) which facilitated their passage through normal capillaries of the tufts; hemoglobin, egg-albumin and the Bence-Jones protein seem to be such proteins.[4, 8] Finally, it appears that the tubules cells may become functionally and anatomically damaged under conditions of this sort,[2, 12, 25] eventually allowing passage of yet more protein with final disorganization of the kidneys.

The proteins in question need not be exotically abnormal ones. Thorn induced proteinuria, in patients with chronic hepatitis but previously without proteinuria, by repeated infusions of human serum albumin.[31] Others have since provoked proteinuria in entirely normal human subjects by similar means, extending earlier observations of the same sort in experimental animals.[24] Such proteinuria in the absence of a primary renal lesion might conceivably occur as the result of spontaneous aberrations in the formation of the plasma proteins; from time to time it has been suggested that pure lipoid nephrosis is a metabolic disturbance rather than primarily a renal one.[17] Addis has shown decisively in at least one patient[2] that it is possible to observe proteinuria before the appearance in the urine of casts and especially renal tubular cells—that is, before objective evidence of a renal lesion. Others have recorded hypoproteinemia and edema preceding proteinuria in rare instances,[15, 18] and there is even a poorly documented report of normal renal tissue by biopsy early in the course of the nephrotic

From the Department of Medicine, Stanford University School of Medicine, San Francisco 15, California.

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syndrome. The relative importance and frequency of this sequence of events remain to be determined, but it should be noted that Addis[3] has seen a score of patients in whom he considered that tubular degeneration was caused by abnormalities of plasma protein formation.

Quantitatively, the heat and acetic acid test leaves much to be desired. Measurements of the rate of proteinuria in grams per 24 hours are a diagnostic aid as well as a necessity before dietetic therapy. The normal minute rate of proteinuria occasionally yields a cloud when heated acid urine is sufficiently concentrated, while minor degrees of abnormal proteinuria are lost in dilute specimens. Moreover, differential diagnosis is facilitated: 20 gm. of protein per day, for example, is found in glomerular nephritis but not with pyelonephritis, renal arteriosclerosis, orthostatic albuminuria, etc.[3]

One may observe variable rates of proteinuria under certain conditions, as with the upright position or exercise in subjects with orthostatic albuminuria. In this state, careful search usually reveals casts and renal cells indicative of a transitory renal lesion which disappears *entirely* soon after the recumbent position is reached;[27] it is occasionally necessary to have the subject empty the bladder after he has been in bed for an hour or two (voiding without arising) before starting the collection of nocturnal urine. In view of the preceding discussion, it might be recorded here that in some subjects with orthostatic albuminuria the diurnal appearance of proteinuria fails to precede that of casts and renal cells in the urinary sediment; all occur simultaneously within an hour or so after the subject stands. Attention might also be directed again to the occasional gross abnormalities found by intravenous pyelography of such subjects.[26] In a unique patient, proteinuria (noctalbuminuria) appeared only during the hours of sleep,[14] a finding which reminds one of individuals with paroxysmal nocturnal hemoglobinuria.

Even when there is an underlying renal disorder which is presumably constant, the rate of proteinuria is variable. It is increased by the upright position, exercise and fever.[5] Similar increases follow the infusions of albumin into patients with the nephrotic syndrome,[21, 30] as they do after transfusions of plasma or whole blood. Congestive heart failure elevates the rate, or at times appears to provoke proteinuria. Conversely, rest in bed diminishes the rate of proteinuria, but this is not to be taken as a therapeutic suggestion for the patient with a chronic renal lesion. Some observers have found that the administration of alkalies reduces proteinuria,[5] abolishes it in some subjects with benign proteinuria, and even prevents it after exercise. This phenomenon may be related to, but is as yet distinct from, the solidification of protein into casts;[22] in this connection, the earlier alleged value of alkalinizing the urine after intravascular hemolysis has been questioned.

Increased rates of proteinuria have also been found during periods of high protein intake by patients with chronic glomerular nephritis;[5, 7, 16] such diets have similar effects in animals with experimental renal disorders.[1, 11] It is also true that low protein diets are followed by less proteinuria, but this is not thought to be the reason for the efficacy of such diets in therapy; the work of Addis[3] should be consulted on this point.

Variations in the rate of proteinuria are not necessarily accompanied by parallel changes in the intensity of the renal lesion or by fluctuations of renal function in the clinical sense. We have failed to find increases in rates of excretion of casts or of renal tubular epithelial cells when infusions of human albumin magnified proteinuria in patients with the nephrotic syndrome, and have observed simultaneous reductions in previously elevated concentrations of creatinine and urea in the serum of those individuals. It seems likely that at least the more abrupt alterations in rate of proteinuria are brought about by variations in renal blood flow and glomerular filtration rate, as well as by changes in the concentration of albumin in the serum.

It scarcely need be said that one does not treat the symptom "albuminuria," but rather the patient whose urine contains protein. Even a diagnosis is not sufficient; therapy also depends upon the patient's story, complaints, and the results of physical examination and of a few, simple laboratory procedures. Among the latter are a reliable measure of one of the non-protein-nitrogenous substances in the serum for the detection of renal insufficiency, and roentgenograms of the kidneys (preferably with intravenous pyelography) when chronic pyelonephritis is suspected. Even more important is the intelligent examination of satisfactory specimens of urine, with particular reference to the sediment and sometimes to bacteriologic study.

In some patients it will be found that no treatment at all is indicated, as when proteinuria appears only after exercise, cold showers, or injections of epinephrine, or when it occurs in individuals with sunburn or orthostatic albuminuria.

At other times the kidneys may be ignored at least temporarily while therapy is directed elsewhere. For example, penicillin is needed for the nephrotic syndrome in early syphilis, or British anti-Lewisite (BAL) for mercury poisoning, or surgical relief of the obstructive jaundice which has produced "bile nephrosis," etc. The need for extrarenal measures is even more important in the toxemia of pregnancy, and it should be remembered that minor degrees of proteinuria and elevation of non-protein-nitrogen in the serum do not contraindicate the use of diuretics when congestive heart failure is the chief problem.

At still other times, treatment of the patient with proteinuria and a chronic renal lesion (glomerular nephritis, pyelonephritis, polycystic kidneys, etc.) consists primarily of an adjustment in his protein intake. In this discussion of the significance of proteinuria there is no place for any extensive

section on dietetic management, but one point is both pertinent and important: It is imperative that the rate of proteinuria be measured occasionally so that amounts of protein equivalent to the daily loss can be added to the restricted intake in order to assure adequate nutrition.[3]

Other problems in treatment can be no more than mentioned: small amounts of sulfonamides in chronic pyelonephritis, adjustments in the intake of sodium salts during the nephrotic syndrome or with uremia, the use of Southey's tubes or infusions of albumin for edema.

ADDENDUM

Five important contributions relating to the mechanism of proteinuria have become available since this review was submitted for publication. Bull[10] has found increased pressure in the tributaries of the inferior vena cava in subjects with orthostatic proteinuria; he offers evidence that this syndrome results from compression of the vena cava by the liver. Whipple's group[29] studied the effects of raising the serum protein concentration in dogs by means of infusions of plasma; massive proteinuria so produced cleared within one to four days after the last infusion, and the kidneys were normal histologically. Lippman[19] reported that the clearance of hemoglobin by the rat kidney was doubled by intraperitoneal injections of bovine albumin; he suggested that the tubular protein reabsorption mechanism was saturated and that glomerular permeability to hemoglobin increased under the experimental conditions. Brandt and Gruhn[9] provoked proteinuria in rabbits by strongly pressor doses of renin. Their data permitted calculation of the concentration of protein in glomerular filtrate, which was found to be of the order of 11 to 33 mgm. per 100 cc., and they concluded that renin did not increase glomerular permeability to hemoglobin. Oliver[23] has described in detail the structural changes which appear in the cells of the proximal convoluted tubules during experimental proteinuria.

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The Treatment of Sinusitis in Children

VICTOR GOODHILL, M.D., *Los Angeles*

SUMMARY

The sulfonamides and antibiotics have been of great value in reducing the duration and severity of acute sinusitis in children.

Chemotherapy, in the acute case, will probably prevent much chronic sinusitis of the infectious type.

The most common variety of chronic sinus disease is due to a primary allergic condition plus secondary infection. It is impossible to treat these cases successfully without treating the allergy as well as the infection.

The home use of any nose drop preparation is of very little value in the treatment of chronic sinusitis of any type or localization.

The local nasal use of sulfonamides or antibiotics is not based upon rational principles. Their clinical value is negligible. They may, moreover, be decidedly irritating to the nasal mucosa.

One should not hesitate to resort to rational surgical procedures to improve nasal ventilation in a child with sinusitis.

While the advent of chemotherapeutic, antibiotic and antihistaminic drugs has been of inestimable value in the treatment of chronic sinusitis, we must not neglect to surgically correct anatomical defects and irreversible pathological mucosal changes which interfere with proper nasal physiological processes.

THE treatment of sinus disease in children has occupied the attention of many otolaryngologists and pediatricians since Dean first introduced its importance to American medicine about thirty years ago. This is a discussion of modern sinus therapy in children based upon etiology and anatomical localization of the disease, with consideration of the usages of newer drugs. It is impossible to generalize in discussing the therapy of this condition, inasmuch as one is dealing with a host of different diseases. The methods of treatment suggested are not original. This is rather an attempt to simplify and correlate well known methods according to personal practice.

PATHOLOGICAL CLASSIFICATION

It is necessary to precede this discussion with some type of classification. The factors of age and physiological status are important in these conditions as in all others. However, two important aspects must be stressed in a classification of sinus disease. These are etiology and anatomy.

A. *Etiologic classification:*

1. *Infection:* The infectious inflammatory processes in the sinuses are produced by the common respiratory organisms, in which staphylococci and streptococci predominate in that order. The pathological changes are the usual changes in infection and are characterized chiefly in the sinuses by mucosal edema, exudation, pus formation, hyperplasia, fibrosis, and osteitis.

2. *Allergy:* Allergic processes very commonly have their major seats within the paranasal sinuses, as well as within the nose proper. The pathological end results of allergy include edema, hyperplasia, polyposis, fibrosis, with the secondary sequelae of mechanical obstruction and ostial blockade.

3. *Miscellaneous* etiologic factors include many things. (a) *Metabolic dyscrasias,* such as hypothyroidism and other endocrinopathies may produce changes in the mucosa of the upper respiratory tract. (b) *Neurovascular factors* may produce instability in the blood vessels of the sinus mucosa and give rise to pathological changes resembling those in allergic conditions.

B. *Anatomical classification:*

1. *The maxillary sinus* is usually present at birth. It is by far the most important sinus anatomically and clinically, in the child as well as in the adult. This statement is made with due regard to the fact that the ethmoid, in the past, has been accorded this place of importance. We must remember, however, that the maxillary sinus is a very small sinus at birth and embryologically represents an outgrowth from the middle meatus. Its relationship to the inferior meatus is relatively distant in infancy and the very narrow medial-lateral diameter of the sinus must be constantly kept in mind in the very young child. The lateral aspect of the sinus in the infant rarely goes beyond the line of the infraorbital canal. It is only in the older child that the maxillary sinus extends laterally to this structure. This must be kept in mind in all manipulations made either through the inferior meatus or through the canine fossa.

2. *The ethmoid labyrinth* is always present at birth. The cellular development within the ethmoidal labyrinth, which is at first a primitive solid structure, is quite variable. The ethmoid labyrinth in the past was considered to be the most common site of sinus disease in the young child, even to the exclusion of the maxillary sinus. However, our experience has

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been somewhat different. Anatomically, both maxillary and ethmoid sinuses are present at birth. By virtue of location and size the maxillary is of greater importance clinically than the ethmoid labyrinth. However, the ethmoid labyrinth, because of its relationship with the medial orbital wall, produces the occasional picture of orbital cellulitis accompanying ethmoiditis.

3. *The sphenoid sinus* develops at approximately the age of five or six years as a pneumatized anatomical entity. However, the sphenoid sinus may be pneumatized as early as the first year of life. It has been a rare seat of osteomyelitis and sepsis in infancy.

4. *The frontal sinus* begins to develop clinical-anatomical importance at about the eighth or ninth year of life. However, in rare instances a frontal sinus has been of clinical significance at two or three years of age. Usually it is not demonstrable anatomically at birth.

DIAGNOSTIC ASPECTS

It is not within the province of this paper to enter into the rather lengthy and important subject of diagnosis of sinus disease in children. However, a few important diagnostic aphorisms will be briefly mentioned:

1. The presence of profuse mucoid or mucopurulent discharge in the nose does not necessarily indicate the diagnosis of sinusitis.

2. The complete absence of secretion in the nose or nasopharynx does not necessarily rule out sinusitis.

3. Chronic cough in a child is frequently due to an undiagnosed latent sinusitis, frequently in a unilateral maxillary sinus.

4. Sinusitis often is incorrectly diagnosed in children who actually have only pharyngeal and nasal tics due entirely to psychosomatic factors.

5. Transillumination in the child is occasionally a false guide in diagnosis.

6. The demonstration of eosinophilia does not necessarily prove that one is dealing with a purely allergic nasal condition.

7. The lack of eosinophilia does not rule out allergic conditions.

8. Headache is not a common symptom of sinus disease in children, unless it is present during an acute frontal or ethmoid sinusitis. It is not at all a common finding in chronic sinus disease in children. If it occurs, some other cause should be searched for.

TREATMENT OF ACUTE INFECTIOUS PANSINUSITIS IN THE INFANT

The infant under the age of 18 months, with the clinical picture of acute pansinusitis, either unilateral or bilateral, of purely infectious type, will have toxemia, fever and classical clinical findings of bacterial invasion. In these infants we are usually dealing with an acute maxillary plus ethmoid infection. Very rarely is the sphenoid involved. The frontal sinus usually does not exist at this age. The following plan of treatment is usually adequate:

A. *Chemotherapy:* This should include the most suitable chemotherapeutic agent as indicated bacteriologically. Usually sulfadiazine and penicillin, or either alone, will be adequate chemotherapeutic weapons. Sulfadiazine and penicillin together show a somewhat better clinical effect than either alone. However, if for reasons of sensitivity to either one of the drugs the other must be used alone, good results may still be obtained. Chemotherapy must be intelligently chosen to meet the bacteriological needs and must be in sufficient dosage to be adequately bacteriostatic and bactericidal. Finally, it must be administered over a long enough period of time to allow for complete subsidence of the infection without the possibility of masking and recurrence.

Penicillin is best administered parenterally, of course. We have had excellent results, in spite of occasional local reactions, with the 300,000 units in oil and novocain preparation. Recently oral penicillin has shown value provided it is given in sufficient doses. No dosage of less than 100,000 units by mouth, every three or four hours, is of value even in an infant. Naturally all the toxic reactions and all the dangers of chemotherapy should be carefully kept in mind.

B. *Environmental aspects:* It is important in the treatment of acute infectious sinus disease in an infant to keep the child in a room where the humidity and temperature can be kept within uniform limits.

C. *Local therapy:* This must not be too vigorous. It should be limited to:

1. The gentle removal of thick nasal secretions by suction with a rubber bulb every few hours and followed by

2. The instillation of a few drops of a warm isotonic and non-irritating vasoconstrictor of neutral, or slightly acid, pH into each nostril.

In my experience there has been no evidence of clinical effect from the use of either sulfonamides or antibiotics as nose drops. All I have seen as a result of penicillin, sulfa, tyrothricin, and streptomycin nose drops, is an irritative reactive vasomotor rhinitis, which sometimes does the patient more harm than the original disease for which he was treated. There is no rationale pathologically for the employment of these drugs locally. The infectious process is in the submucosa. There is no particular value to the instillation of chemotherapeutic agents which usually cannot even penetrate the thick purulent coating on the nasal mucosa. Indeed, by their irritating action these drops may destroy whatever functional efficiency still remains in the mucous blanket and cilia. The only reason for the use of a vasoconstrictor is to allow for the creation of a better airway which in turn will allow for the removal of secretions and better ventilation of the sinuses.

The infected nasal mucosa is desperately battling the invasion of bacteria by the use of ciliary activity

and the mucous blanket. Nothing should be done that will destroy this ciliary activity or jeopardize the integrity of this mucous blanket. In utilizing nasal preparations, it must be remembered that pH and isotonicity are two different things. An isotonic preparation may have a pH far too alkaline for the nose, and a neutral pH preparation might not be isotonic in nasal secretions. When we discuss pH we are talking about acid base balance and when we talk about isotonicity we are talking about osmotic pressure. While the two are related they are two different concepts, physically and chemically.

D. *Sympathicomimetic and antihistaminic drug therapy:* In those cases characterized by intense vasomotor collapse of the nasal mucosa, where there is a profound edema interfering with the airway, it is frequently of value to employ sympathicomimetic and antihistaminic drugs by mouth, in addition to the already mentioned treatments. Of these drugs propadrine hydrochloride and pyribenzamine have been of greatest value.

THE SURGICAL TREATMENT OF ACUTE ETHMOIDITIS WITH ORBITAL CELLULITIS OR ORBITAL ABSCESS

In this very classical picture which we are seeing rather rarely today, since the advent of chemotherapy, the child usually has marked swelling of the orbit. The upper lid is usually very red and edematous, especially in the medial orbital area.

Most cases will respond to the therapy outlined above. However, if there is no quick clinical response, surgical intervention is in order.

The incision is made in a curved fashion approximately 1 cm. medial to the inner canthus, over the nasal bone, and is carried through the skin and periosteum down to the bone. The periosteum is reflected laterally from the lamina papyracea, and usually free pus will be encountered subperiosteally. If no free pus is encountered, the lamina papyracea and the lacrimal bone itself may be removed, at which time the ethmoid labyrinth is usually found to be full of thick mucopus. The wound is left open with a rubber tissue drain in place. Obviously the medical regimen described above must also be continued until resolution of the disease.

SURGICAL TREATMENT OF ACUTE FULMINATING FRONTAL SINUSITIS

This disease is not a disease of infants, but may very well be a disease of older children. We have seen it in children of seven and eight, but it is more commonly found in the older group in the 'teens. Surgical treatment is only resorted to when the medical treatment previously outlined has been employed for a sufficient length of time to demonstrate its lack of effectiveness. This should not be too prolonged. In a child with actual edema of the orbit or brow, such general medical treatment should rarely be used alone for more than 12 hours. If there is no clinical response within that time, and the pain, tenderness, fever, and swelling persist, then surgical treatment is urgently indicated.

If there is obvious evidence of a subperiosteal abscess, then there is no rationale to medical treatment other than as an adjuvant. In these cases operation is imperative at once, in order to prevent the all too frequent incidence of spreading osteomyelitis in the skull and intracranial complications which are frequently fatal. In such cases the patients should be treated surgically externally only. The mucosa of the nose should not be meddled with. The operation of choice is the trephine of the floor of the frontal sinus in its medial aspect, as described by Dr. J. Mackenzie Brown. This area is entered by the use of a burr or chisel. The mucosa is usually not touched unless there are signs suspicious of intracranial invasion; but if there are such signs the posterior mucosal and bony wall of the sinus may be stripped and removed to expose the dura. In the absence of intracranial signs, the sinus is merely entered and a large rubber tube drain is inserted through the trephine opening. No intranasal operation is done, and the nasal frontal duct is left alone. Postoperatively the patient should be kept on the intensive medical regimen outlined above. The patency of the tube into the frontal sinus must be maintained at all times without question. These patients usually respond to trephine plus medical treatment in a very few days. When the discharge from the frontal drain ceases and when the nasofrontal duct appears to be perfectly patent (as studied by the return of a colored solution through the nose when injected into the frontal sinus via the rubber drain) it may safely be withdrawn and the wound allowed to close by itself. The incision should be made immediately below the unshaved eyebrow. Usually no scar results.

THE SURGICAL TREATMENT OF ACUTE MAXILLARY SINUSITIS WITH ORBITAL CELLULITIS OR ABSCESS

This is a rather rare occurrence. However, several cases have been seen in the Children's Hospital, Los Angeles, within the past few years. In cases of this type an incision is made below the lower lid above the inferior orbital rim. The elevation of the periorbita over the floor of the orbit is continued until a break in the bone of the orbital floor or antrum roof is encountered. A rubber tube drain is inserted.

In considering the treatment of acute infectious sinusitis in childhood, the acute infection of the sphenoid is not mentioned because it is an extremely rare entity and would theoretically, unless accompanied by osteomyelitis, respond nicely to intensive medical therapy. It is only the sinuses which have external topography that occasionally require the employment of external surgical operations for the purpose of expediting better drainage.

THE TREATMENT OF ACUTE ALLERGIC SINUSITIS IN CHILDREN

This is a severe form of allergic rhinitis characterized by severe rhinorrhea, nasal obstruction, mucosal edema, severe pruritus of the nose and

pharynx, sneezing, and lacrimation. It is incorrect to speak of it as acute sinusitis; it is acute panrhinitis and panrhinosinusitis due to an allergic condition. The terms "sinusopathy" and "rhinopathy" would be more appropriate in this sense than sinusitis and rhinitis. It is important to remember a few dicta in the treatment of this disease:

A. Avoid local therapy. Nose drops of all types are contraindicated in this condition.

B. Enforce all dust and anti-inhalant allergen precautions.

C. Temporary elimination diet of the common food offenders, regardless of skin tests, and regardless of results of previous food elimination tests, should be effected. These common foods which should be eliminated are milk, eggs, wheat, chocolate, citrus fruits, and their derivatives.

D. Intensive oral medication with sympathicomimetic amines such as propadrine, ephedrine and neosynephrine, plus the employment of antihistaminic drugs, such benadryl, pyribenzamine and others, will prove of great value in reducing the temporary severe mucosal edema, pruritus and rhinorrhea.

CHRONIC SINUS DISEASE IN CHILDREN

There are three types of chronic sinus disease in children.

A. Pure infectious sinusitis. This is rare in children.

B. Pure allergic sinusopathy and rhinopathy is not common in children.

C. Mixed allergic and infectious sinusitis is very common in children and is perhaps the most common type of chronic sinusitis encountered in the child as well as in the adult.

TREATMENT OF CHRONIC INFECTIOUS SINUSITIS IN CHILDREN

This is a self-limiting and self-curative condition, usually, if the mechanical and contiguous infection factors are eliminated. Local therapy to the sinuses is rarely necessary. The localization is usually in the antrum primarily and ethmoid secondarily. The sphenoid and frontal sinuses are only rarely involved in children. This disease is usually unilateral but may be bilateral.

A. *Mechanical factors:*

1. Obstructive adenoid mass. This may be obstructive because of (a) its intrinsic large size; (b) congenitally small and narrow nasopharynx.

2. Septal obstruction produced by a major deflection, usually of traumatic origin either in the anterior or superior aspect of the nasal septum. These deflections should be corrected, if they actually are of such location and of such magnitude as to constitute truly obstructive lesions. Minor septal deflections should not be touched. They are probably not significant etiologically. Septal operations in children are not contraindicated, provided they are done with adequate attention to replacement and reconstruction of the septal cartilaginous framework.

B. *Contiguous or adjacent infection:*

1. Infected tonsils and/or adenoids. Very obviously an obstructive adenoid is of significance from the standpoint of poor nasal ventilation. However, infected adenoid tissue or infected tonsils will frequently be a reason for continuous reinfection of chronic maxillary sinusitis. In the removal of tonsils and adenoid in a case of sinusitis, it is very wise to employ preoperative and postoperative chemotherapy because frequently chronic sinusitis may be thrown into an acute exacerbation immediately following the tonsillectomy and adenoidectomy. Usually this can be avoided by preoperative and postoperative chemotherapy.

2. Infected lateral pharyngeal bands, and infected lymphoid follicles of the nasopharynx, may be the cause of recurrent attacks.

3. Infected teeth, especially anterior upper teeth, may be very important in constant low-grade infection of the maxillary sinus floor.

C. *Local treatment:*

This is frequently unnecessary. Most cases will subside spontaneously if infected tonsils and nasopharyngeal lymphoid tissues are removed. Occasionally, a short series of simple nasal irrigations with warm Ringer's solution may be necessary as adjunctive treatment. Such irrigations are of great value in the mechanical removal of nasal secretions and the heat in itself may possibly be a physical factor in producing the spontaneous expulsion of thick mucopurulent masses from the maxillary sinus. Nasal irrigation is of greatest value in the subacute type of maxillary sinusitis. It is of moderate value in the chronic case. Antrum punctures are occasionally necessary. Diagnostic puncture and irrigation of an antrum frequently is done at the time of tonsillectomy and adenoidectomy. Such a procedure frequently has a marked therapeutic value as well if the secretion is thick and tenacious. One such antrum puncture may be sufficient to initiate good antral ventilation and drainage.

Very rarely, when the material obtained on antrum irrigation is pure creamy pus, an antrum window may be made to facilitate and expedite further irrigations. The Caldwell-Luc operation is practically extinct in the present-day therapy of pure infectious maxillary sinusitis in children.

Displacement therapy (Proetz treatment) is of distinct value in those cases in which localization is primarily in the posterior group (ethmoid-sphenoid). Since this variety of sinusitis is relatively uncommon in children, the displacement treatment does not have wide usage in pediatric rhinology.

X-ray therapy and vaccine therapy in this condition are of little or no value. There is some value in chemotherapy in a prolonged course, using relatively small doses.

TREATMENT OF CHRONIC PURE ALLERGIC SINUSITIS

This is essentially the treatment of allergic rhinitis and requires no specific measures for the paranasal sinuses. The treatment may be outlined as follows:

A. Elimination of offending foods.

B. Avoidance of dust and other environmental inhalant allergens.

C. Desensitization to inhalants such as pollens, dust and molds by injections. This is not always a necessary or advisable step.

D. Correction of factors in the home producing faulty heating and humidity.

E. Avoidance of local nasal medication.

F. Conservative removal of obstructive and pedunculated irreversibly edematous mucosal polypoid masses.

G. Reduction of chronic mucosal edema of turbinates by judicious conservative cauterization.

TREATMENT OF CHRONIC MIXED ALLERGIC AND INFECTIOUS SINUSITIS

This syndrome is very common. Allergic rhinopathy in some children predisposes to secondary infections. Infectious sinusitis frequently conversely acts as an exciting factor in latent allergy. The end result is a disabling chronic disease with a train of symptoms throughout the body. Cough, fever, wheezing, headache, urinary complaints, and gastrointestinal upsets are frequently seen. It is a generalized disease, a pediatric problem with rhinological aspects. The treatment of chronic mixed allergic and infectious sinusitis in children should be outlined as follows:

A. *Adequate pediatric care* with particular attention to nutrition, basic hygiene and psychosomatic orientation.

B. *Treat the infectious aspect.*

1. Eliminate mechanical factors, such as obstructive adenoid, and major septal obstructions.

2. Remove contiguous infection in the tonsils, adenoid, pharyngeal hyperplasia, and the teeth.

3. Local treatment is of limited value, far more limited than in the purely infectious type.

4. Chemotherapy is of limited value in some cases.

C. *Treat the allergic aspect.*

1. Food elimination by trial and error. Obviously nutritional balance should be maintained by adequate substitution and replacement of vitamins and minerals.

2. Eliminate dust and inhalants.

3. Inhalant desensitization. This is not very frequently necessary in the child. Because of the frequent bad psychic sequelae of a prolonged series of injections, such desensitization should be considered the very last resort in pediatric cases.

4. Maintain good airway by conservative removal of polypoid tissue plus cauterization.

5. Adjunctive administration of sympathicomimetic and antihistaminic drugs.

It is impossible to obtain clinical improvement in this large and troublesome group of cases unless each patient is individualized, carefully studied and treated from the infectious and allergic standpoints simultaneously.

2007 Wilshire Boulevard.

The Semiautomatic Rapid Film Changer

Its Use in Radiography and the Recording of Rapid Physiological Movements

CHARLES E. DUISENBERG, M.D., *San Francisco*

SUMMARY

A rapid cassette changer developed at Stanford University Hospital has been successfully used to record, radiographically, swift vascular flow and intrinsic motion of other hollow organs. This aids diagnosis of disease and study of normal physiologic motion.

CONTRAST cardioangiography and angiography are now well established methods of radiologic diagnosis. Successful angiography requires a rapid series of roentgenograms to follow the opacified blood through the great vessels and cardiac chambers. To date, cinematography of the fluoroscopic screen has not proved satisfactory for work of this type and most investigators have used full-sized

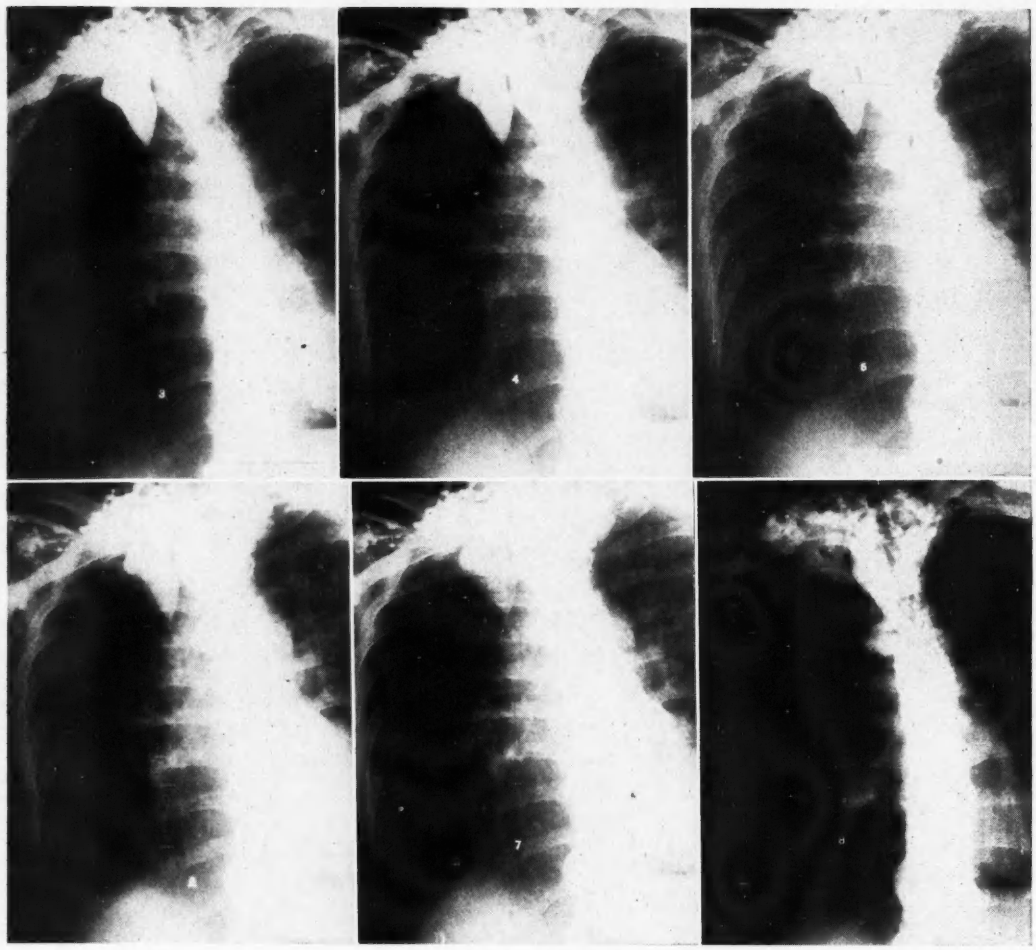

Figure 1.—Serial roentgenograms (time interval between roentgenograms 4/5 second) on a 50-year-old woman. Forty cc. of 70 per cent Diodrast was injected into the left cubital vein. The progress of the opacified blood can be followed as it visualizes the occluded superior vena cava and the collateral circulation.

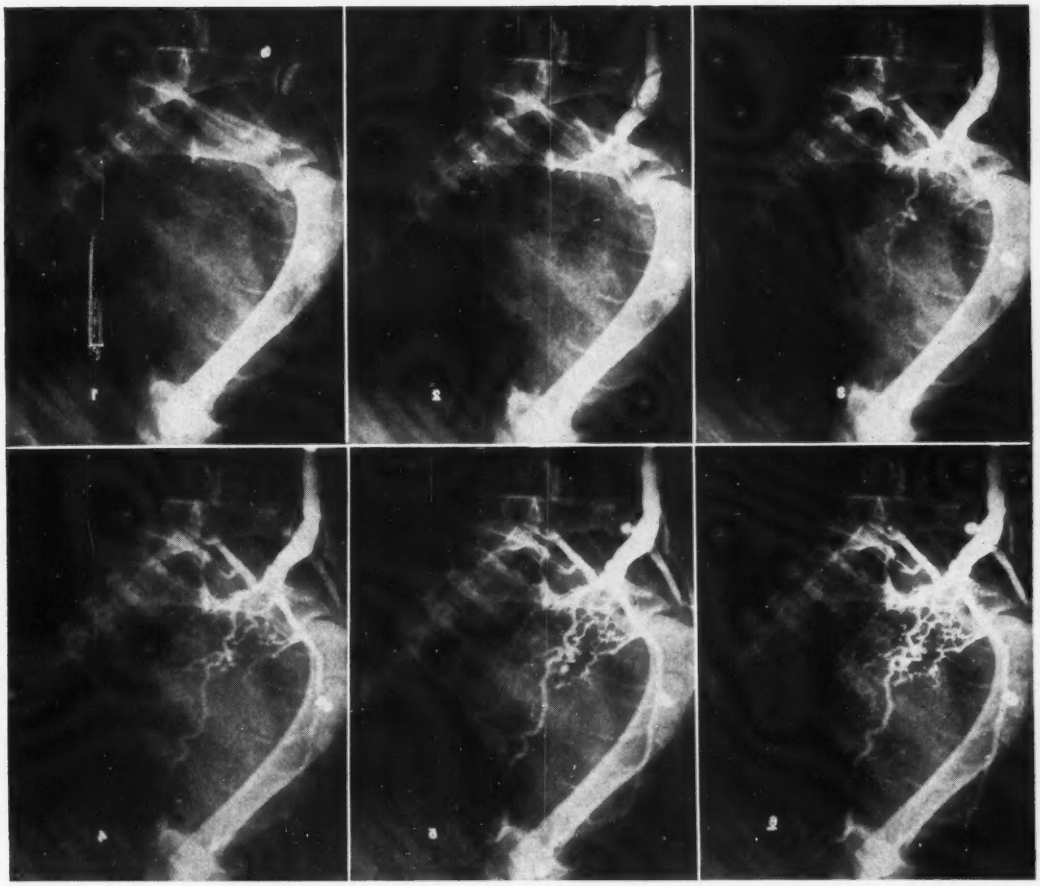

Figure 2.—Serial venograms on an experimental ligation of the superior vena cava in a dog (time interval between radiographs approximately 3/5 second) are an example of the use of the rapid film-changing technique in research of vascular disorders. Note the successive visualization of newly developed collateral veins and the differences in time required for the opaque blood to flow through the veins of differing caliber.

films. In the present state of technical development, the ideal for recording swift movements and vascular flow is a series of conventional full-sized radiographs taken as rapidly as possible. At Stanford University Hospital a satisfactory rapid cassette changer has been developed for this purpose. Films measuring 11 x 14 inches are exposed at a rate of one or two per second to a total of 20 films if the tube will bear so many.

This rapid cassette changer has been used for a variety of examinations with success in recording phases of physiological motion or the progress of opaque material.

The purpose of this paper is to present a few examples of the many possible applications of the rapid cassette changer to investigative and diagnostic radiography and physiology. Pertinent physiologic facts are discussed briefly in each case.

From the Department of Radiology, Stanford University School of Medicine, San Francisco.

Presented before the Section on Radiology at the 77th Annual Meeting of the California Medical Association, San Francisco, April 11-14, 1948.

PHLEBOGRAPHY

The venous system is subject to many unpredictable changes in anatomic structure, pressure and rate of blood flow. During inspiration, the blood is sucked into the thoracic cavity and flow is increased, while during expiration the reverse is true and the blood flow is impeded. Areas of dilatation or thrombosis, and valves, if present, all influence the rate of flow in the venous system. The dependent position of the limb may reduce the flow. All veins are contractile, under the influence of heat and cold and chemical, physiological, and psychological stimuli. In addition to the ordinary influences, the venous bed is usually constricted to some unpredictable degree by the chemical irritation of the opaque medium. All these factors plus the usually unpredictable nature and location of the disease under

investigation invite the use of a rapid serial roentgenographic technique. Figures 1 and 2 are examples of the success of the rapid film changer in demonstrating anatomic changes.

ARTERIOGRAPHY

Actual measurements of the mean velocity of blood flow in animals give values of 18 to 20 cm. per second in the normal aorta. In the carotid and femoral arteries, it is 14 to 15 cm. per second. By cardiac output measurements, it can be shown that these rates are only slightly higher in man. Changes in pressure and the distensibility of the arterial tree modify the rate of flow; but, in general, a mean flow of 20 cm. per second gives a good working rule for determination of the speed and interval of exposure necessary to visualize the peripheral arterial system. The flow in the pulmonary circulation is nearly as rapid: 2 to 3 seconds is required for opacified blood to flow from the right ventricle through the pulmonary capillaries and into the left atrium. If Diodrast is used for visualization, some unpredictable degree of arterial spasm is caused by the injection and this should be considered in interpreting the results. Because the blood moves so fast, the opacified portion may remain in the area being studied only one or two seconds. Hence, in arteriography, even more than in venography, a rapid film-changing technique is desirable. Figures 3, 4 and 5 are examples of the successful demonstration of arterial pathological conditions with the rapid film changer.

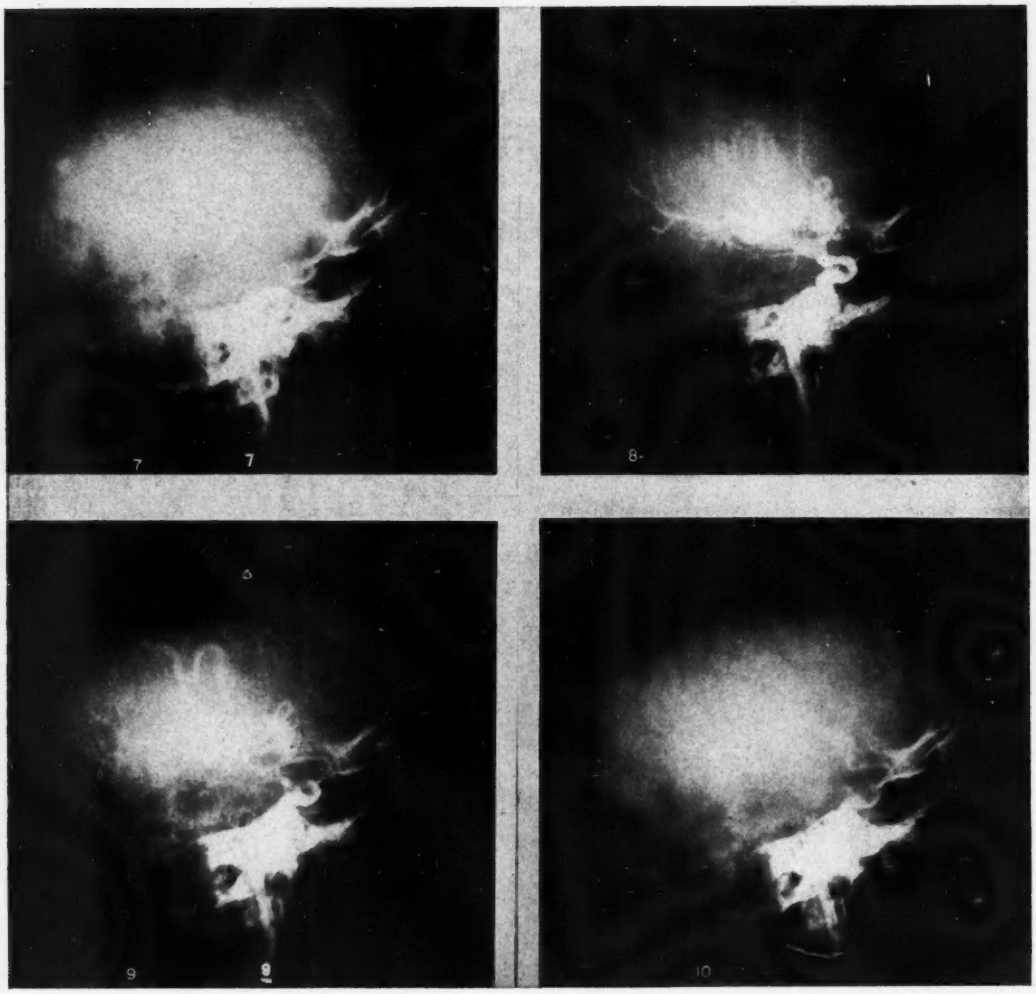

Figure 3.—Serial cerebral angiogram (interval between roentgenograms 3/4 second) on a 32-year-old woman. Ten cc. of 35 per cent Diodrast was injected into the right common carotid. A vascular tumor is demonstrated in the right upper temporal area. If rapid roentgenograms are taken, small quantities of opaque media may be used and good diagnostic visualization obtained.

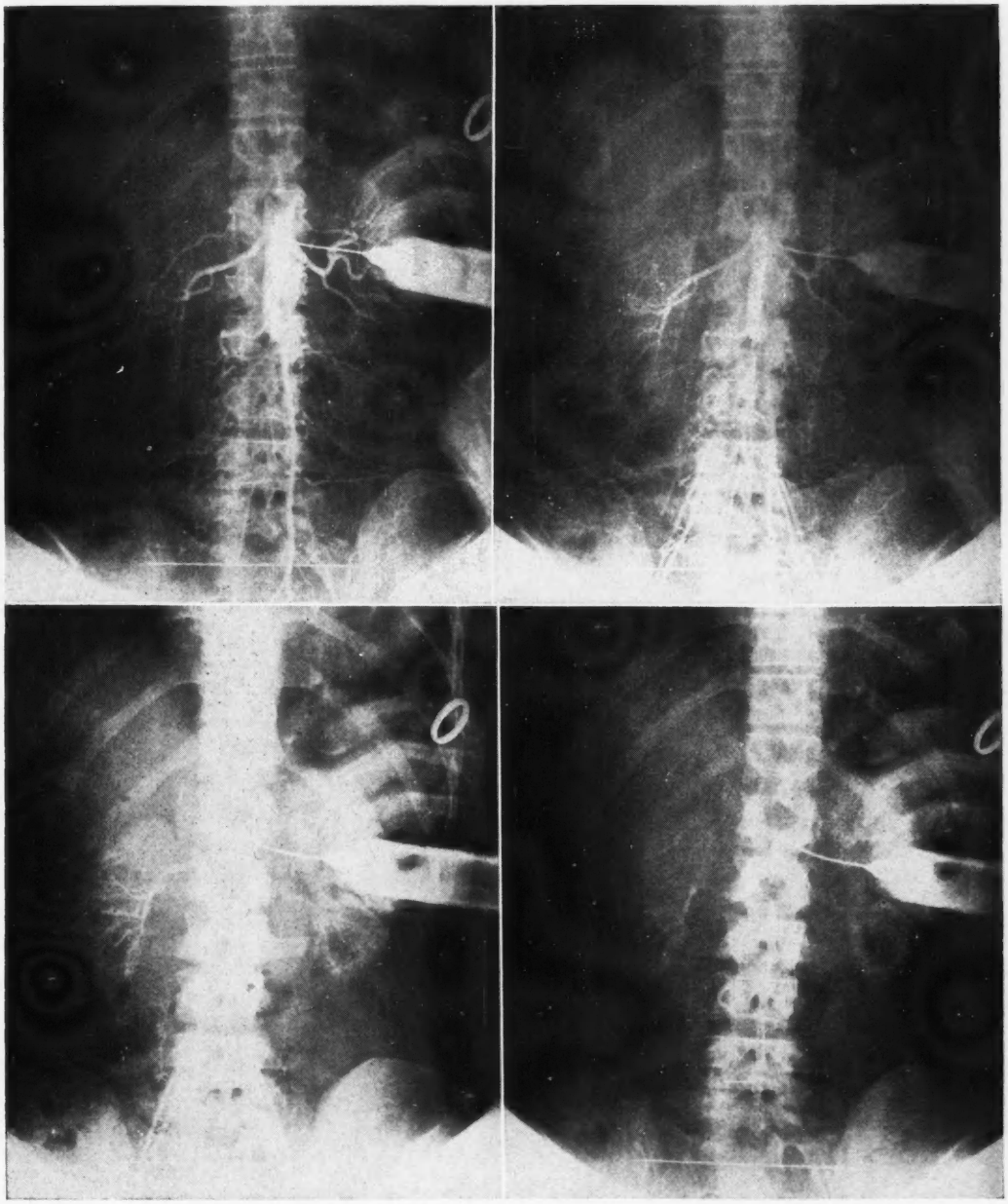

Figure 4.—Serial aortograms made by direct arterial puncture on an adult patient who had absent pulses in the lower limbs. The point of aortic obstruction is demonstrated and the collateral circulation is visualized. Note the visualization of the blood supply to the kidneys.

PERISTALSIS OF THE ESOPHAGUS

In single exposures, peristaltic systole of the esophagus may produce changes which simulate the signs of an early infiltrative lesion of the esophageal mucosa. Rapid serial radiographic studies of the esophagus may be very useful in studying these areas of questionable disease. In this manner, actual peristalsis can be recorded and followed. Esophageal tone and motility are different for the swallowing of liquids and solids. This, as well as the dynamics of the cardiac sphincter, can be recorded. All of these conditions can be seen fairly well fluoroscopically, but the rapid serial-film technique makes it possible to obtain a record of the process on large

films. This makes studies of functional changes accessible to direct visualization.

MUCOSAL MOTION STUDIES

Forssell[1] showed two decades ago that two different and independent peristaltic functions are present in the stomach. One involves the wall of the stomach as a whole, producing waves at 8- to 12-second intervals which start at the cardia and move through the entire stomach to the pylorus. The other type of peristalsis involves only the mucous membrane and is caused by contractions of the muscularis mucosae. Very little is known of the intrinsic motion of the human gastric mucous membrane. Experimental observations in animals, however, have shown that these intrinsic mucosal movements are very rapid and may change the surface contour of the gastric mucosa in a fraction of a second. These changes apparently occur independent of the phase of the large circular peristaltic waves. In view of this, the author tried to visualize the outlines of the fundus of the barium-filled stomach (with the patient holding his breath and lying on his back) on a series of radiographs taken at one-second intervals. Close study of the outlines of the mucosal patterns obtained reveals that there is a rather swift intrinsic motion in the gastric mucosa, characterized by changes in height and width of the folds and resultant reciprocal changes in the depressions between the folds. Figure 6 shows these changes in mucosal contour.

URETEROGRAPHY

In 1904, Lucas[2] noted that the rate of the ureteral peristaltic waves varies greatly with the activity of the kidney and that the amplitude is subject to marked variations. Trattner[3] continued these studies by use of the "hydrophoragraph" (water-wave re-

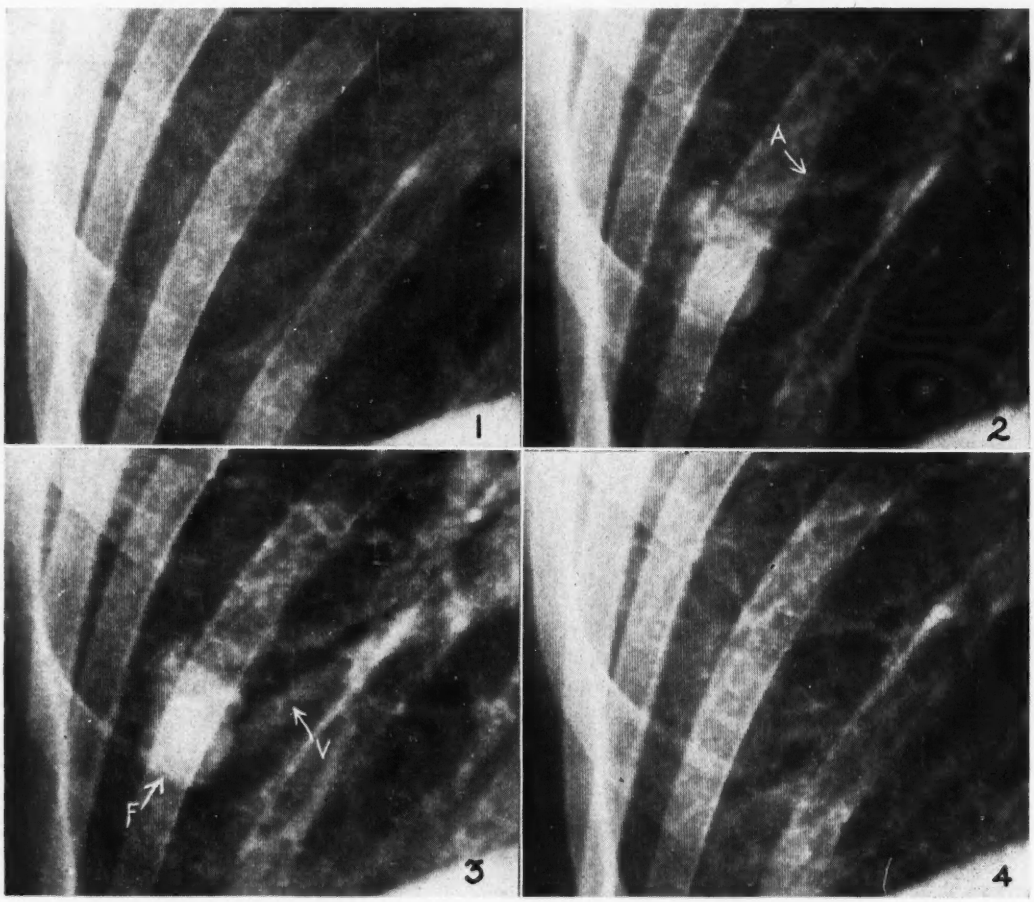

Figure 5.—Four serial radiographs of a small density in right lower lung (taken at 1/2 second intervals) after injection of 70 per cent Diodrast into the cubital vein. The mass is seen to be an arteriovenous fistula (F) of the lung with demonstration in No. 2 of the opacified artery (A) and subsequently in No. 3 of the vein (V). The need for rapid film changing technique is well demonstrated in this series, as it can be seen that the pathology was only demonstrated for a possible maximum period of 1½ seconds.

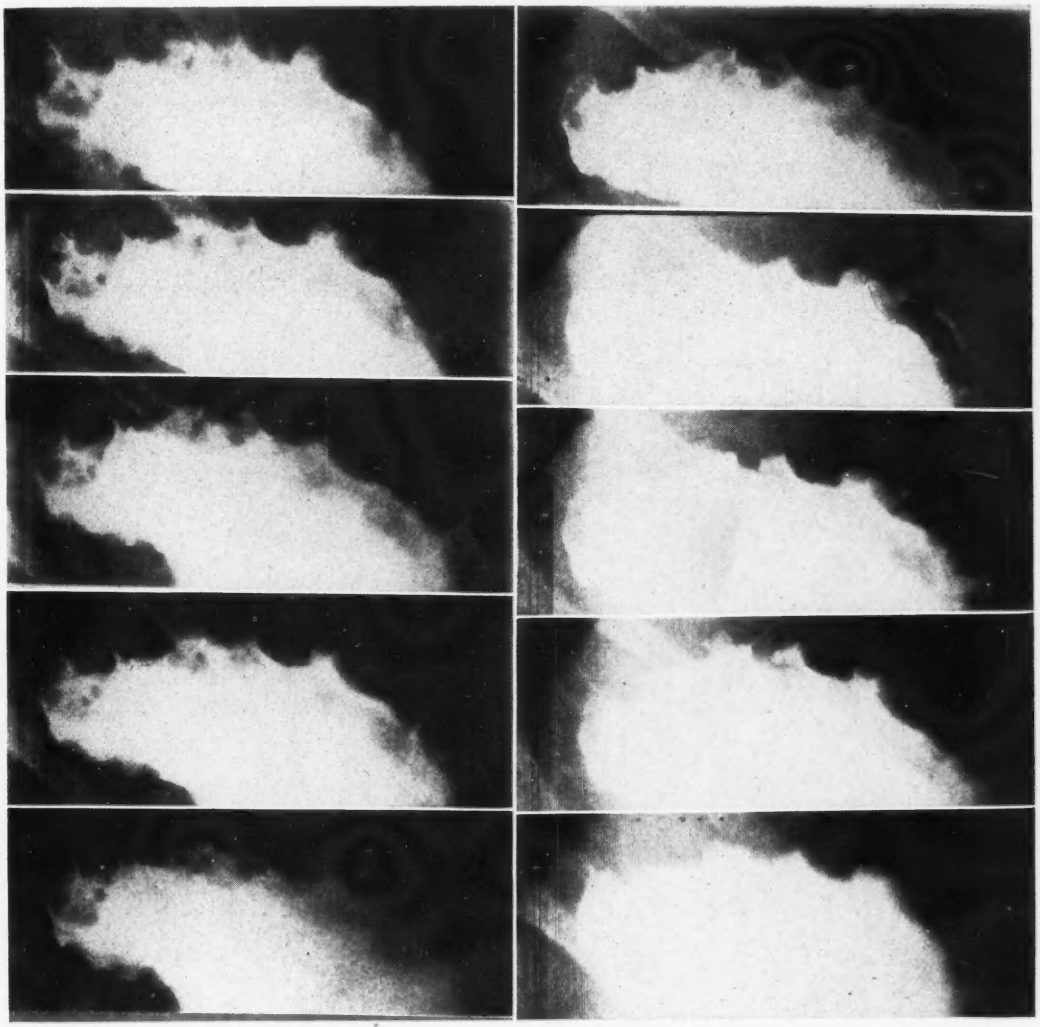

Figure 6.—Serial roentgenographs (taken at 1 second intervals) of the fundus of a barium filled stomach, taken with the patient supine and holding his breath. The fundus was studied because of the absence of circular peristaltic waves. Note the changes in contour of the mucosal pattern caused by the muscularis mucosae.

corder). He observed that ureteral peristalsis consists of (1) a longitudinal contraction which shortens the ureter and narrows but does not obliterate the lumen, and (2) a circular contraction which momentarily obliterates the lumen in successive segments of the ureter as the wave advances. Ureteral peristalsis may be in the reverse direction also. A forward peristaltic systole may begin in the middle or distal third of the ureter. This is then frequently followed by forward peristalsis of the entire ureter. Trattner used radiographs in his investigations, but could not take them at sufficiently rapid rate to visualize the motion directly, and was forced to depend upon indirect methods. The rapid serial-film technique offers a new and relatively simple method of studying the hydrodynamics of the urinary tract. It also has clinical value. In the case illustrated (Figure 7) surgical treatment was decided against after rapid radiography demonstrated peristalsis in calices and ureters.

The examples shown are chosen from a number of successful studies with the rapid film changer to demonstrate some of the varied conditions in which its use may contribute to the clarification of the diagnosis of disease or to the study of pathological and physiological movements. It is the hope of the author that this work may stimulate further investigation by rapid film studies.

Grateful acknowledgment is made to Dr. Frank L. A. Gerbode, Dr. C. E. Grayson, Dr. Evelyn Siris, Dr. Merrill Sisson,

and Dr. Frank Windholz for help and suggestions in this work.

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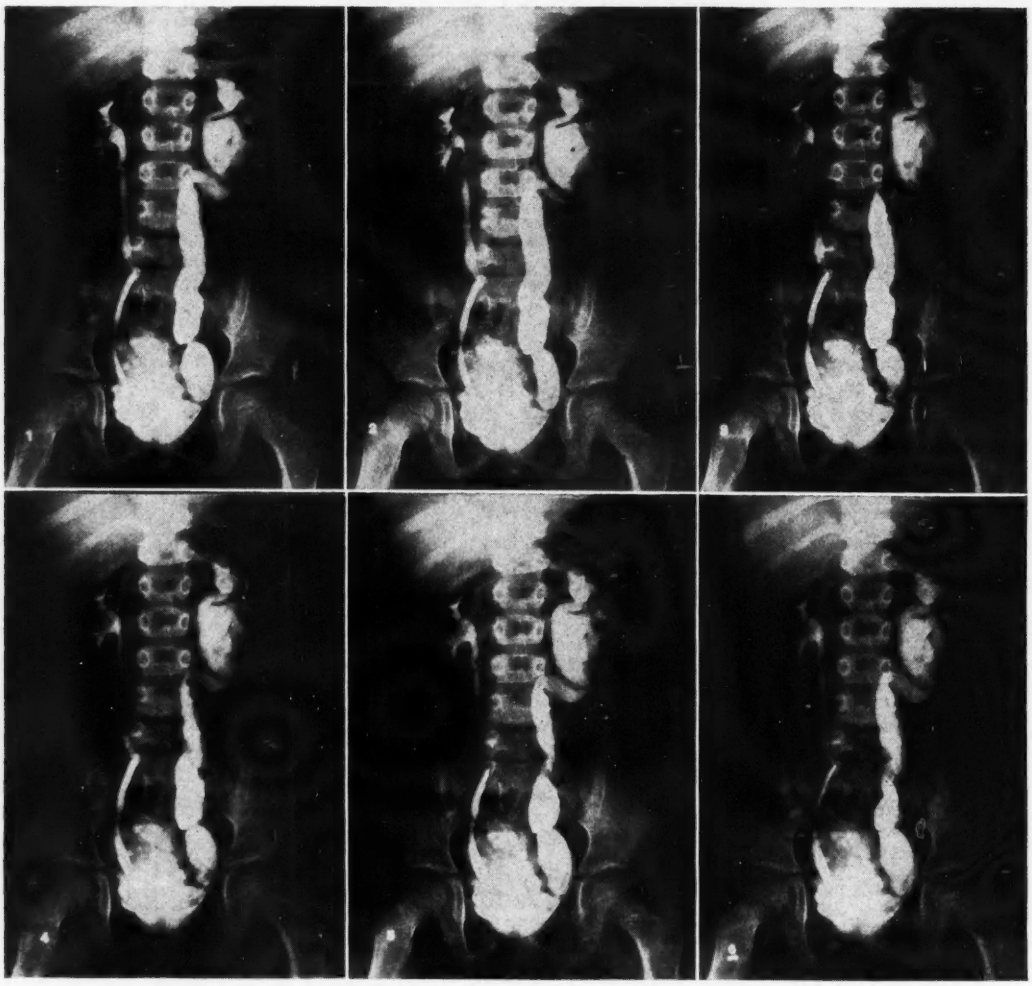

Figure 7.—Serial radiographs of the urinary tract of a 5-year-old girl taken with the rapid film-changing technique. Films were taken at 3/4 second intervals. Retrograde urography shows hydronephrosis and hydro-ureter on the left, moderate widening of the lower half of the right ureter, and deformity of the bladder. The rapid changes of peristaltic systole and diastole can be recognized on the radiographs. It is evident that peristaltic waves are present on the diseased (left) side as well as on the more normal (right) side. It is of interest that in addition to circular contractions, longitudinal contractions can also be observed; this is most evident in the lower segment of the left ureter.

Radiation Therapy of Ringworm of the Scalp

M. E. MOTTRAM, M.D., and HAROLD A. HILL, M.D., *San Francisco*

SUMMARY

A recent epidemic of tinea capitis in children has revived a considerable interest in the methods of treatment of this disease.

The most efficacious form of therapy for M. audouini infections is roentgen epilation.

The various methods of x-ray treatment are briefly presented and compared. A modification of the four-point technique is shown to offer a simple yet safe method of curing ringworm of the scalp. Results with this method compare favorably with the best of those reported by the use of other methods.

Cure was effected by this method in all of a group of 125 cases.

RINGWORM of the scalp in the last few years has again reached epidemic proportions in this country.[7, 8, 14] It is most efficiently treated by epilation of the scalp.[8] It is our purpose to present a simple and safe method of epilation by x-ray which we have used successfully in over 125 cases.

NATURE OF THE DISEASE

Ringworm of the scalp is also known as tinea capitis or tinea tonsurans. The majority of infections are due to the fungus M. audouini and smaller numbers to M. lanosum or to trichophyton.

Diagnosis is usually made by clinical and microscopic examination and use of the Wood's light. M. audouini is separated from the other organisms by means of culture. Tinea capitis is a disease of childhood and more frequently occurs in boys. It tends to persist until puberty[15] unless cured by topical or x-ray therapy.

The latest epidemic started in this country in the East in 1943. Prior to 1944 the incidence in San Francisco was small. The reported cases in San Francisco school children suddenly increased from 268 in 1944 to 613 in 1945 and 616 in 1946. Since then the incidence has diminished sharply.

CONTROL

Unless a vigorous program of control is instituted, epidemics of ringworm disease tend to continue unabated and to spread rapidly. In San Francisco ringworm of the scalp is not a quarantinable disease. A child with the disease is readmitted to school upon presentation of a statement from a physician that he is receiving treatment.[2]

Many public health measures for control of the disease have been advocated, such as detection of cases, isolation of infected children and organization of sanitary regimes in barber shops, schools and theaters.[7, 14] Treatment of the infected child is either by a physician in private practice or at specially organized treatment centers. The main type of treatment has been topical medication. Salicylanilide ointment has been found to be the most effective medicinal agent. However, a large number of treatments (50 to 100) are usually necessary in order to obtain a cure, and a relatively large percentage of M. audouini infections do not respond to topical medication.

Manual and chemical epilation have been used in the treatment of tinea capitis with varying degrees of success. These procedures are apt to be painful and slow and are associated with the dangers of local infection or permanent alopecia. Epilation by means of x-ray treatment has proven to be not only the best and the least dangerous method of epilation, but also the most efficacious in treatment of ringworm of the scalp.

X-RAY TREATMENT

It is difficult to understand why tinea capitis is still a therapeutic problem today when such an effective method of treatment as radiation epilation is available to the medical profession. X-ray treatment has been all too infrequently used because of the fears engendered by the damaging effects of irradiation which sometimes occurred in the period shortly after Roentgen's discovery, and prior to the introduction of a reliable method of dosage measurement.

Calibration of equipment and measurement of the dosage by means of ionization are no longer a problem. However, there are in general use today several methods of x-ray epilation. These revolve around (1) the number of fields or centering points, (2) the size of the fields, and (3) the doses per field.

In an attempt to obtain a uniform distribution of dosage over the entire scalp several overlapping fields are used—usually from three to five.[1, 4, 5, 6, 8, 10, 13, 15] However, in no method is there perfect uniformity of the dosage. In the Kienbock-Adamson technique where five fields are used, there are two areas on each side of the scalp where three fields overlap and in which the accrued dosage may be two to two and a half times that received at the

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centering points.[3, 11] In contradistinction to the five-point method, Schreus and Proppe[3] have shown that the four-point technique has only a single and smaller area of triple overlap on each side and these areas receive a smaller accrued dosage than is given by the Kienbock-Adamson method. Even though some regions receive considerably greater dosage than others, permanent epilation has been reported in a very few instances where the Kienbock-Adamson technique is used and then only in the triple overlap areas; it has never been reported with use of the four-point method.

AUTHOR'S METHOD

The following is an account of our procedure in handling cases of ringworm of the scalp.

We believe that only cases refractory to topical medication should be treated with x-rays.

Children approaching puberty should not be treated. Rothman[12] has found that a certain component of adult human hair is five times as effective as that found in children's hair in inhibiting the growth of M. audouini *in vitro*. This is believed to be the explanation for the spontaneous cures which occur at about 15 years of age (puberty) and why tinea capitis is rarely seen in adults.

Other contraindications to irradiation are severe dermatitis due to infection or chemotherapeutic agents, erythema secondary to ultraviolet rays and previous unsuccessful or successful epilation of the scalp by x-rays.

It is our preference that the patient have the hair clipped, although this is not necessary. If there are heavy crusts on the scalp, these should be soaked off before therapy. A stocking cap should be worn until epilation occurs to collect the infected hairs and diminish the chance of contagion.

The child should be accompanied by a parent in order that his cooperation may be secured more readily. We have seldom found it necessary to use restraint. Occasionally we have had the parent sit or lie down on the table beside the patient during the first treatment to keep him still.

The apparatus we use is a shockproof x-ray therapy tube which has been calibrated with a Victoreen dosimeter. At 140 KV and 25 milliamperes it delivers 100 r per minute at 40 cm. F.S.D. The HVL is 4 mm. Al or 0.2 mm. Cu.

The four fields are set up as follows:

1. Right lateral: The patient lies on his back with the head turned 90 degrees to the left. The centering point is midway between the frontal hairline and the occipital protuberance. This point usually falls just above the ear (Diagram 1).

A protective lead shield is used to cover the face.

2. Left lateral: similar to centering for right lateral (Diagram 1).

3. Occipital: The patient lies on his abdomen with a sandbag under the forehead and the neck flexed. The centering point is in the midline and is 8 cm. above the posterior hairline (Diagram 2).

4. Frontal: The patient is placed in a well-supported sitting position. The centering point is in the midline and 8 cm. from the frontal hairline. Small lead shields are placed over the eyebrows (Diagram 3).

The central beam is always directed at right angles to the central point of the field being treated.

The treatment factors are 140 KVP, 25 ma, 40 cm. FSD, 20 cm. circle field size, no added filter, 300 r in air per field, and only one field treated per day. The course of therapy is completed within a week.

We treat the four fields in the sequence given above, finding that in this manner it is easier to elicit the child's cooperation so that he will hold relatively still.

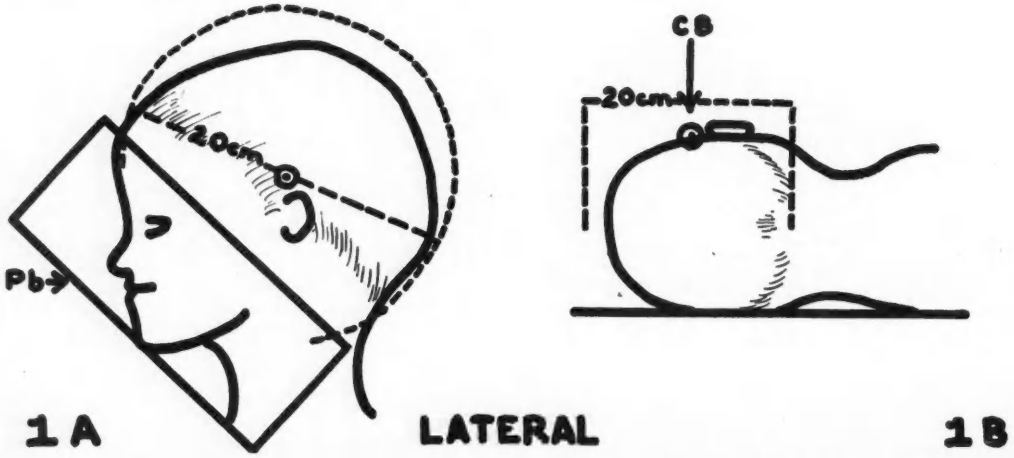

Diagram 1, A and B.—Lateral: Position of the head and direction of the central beam for irradiation of the lateral field(s).

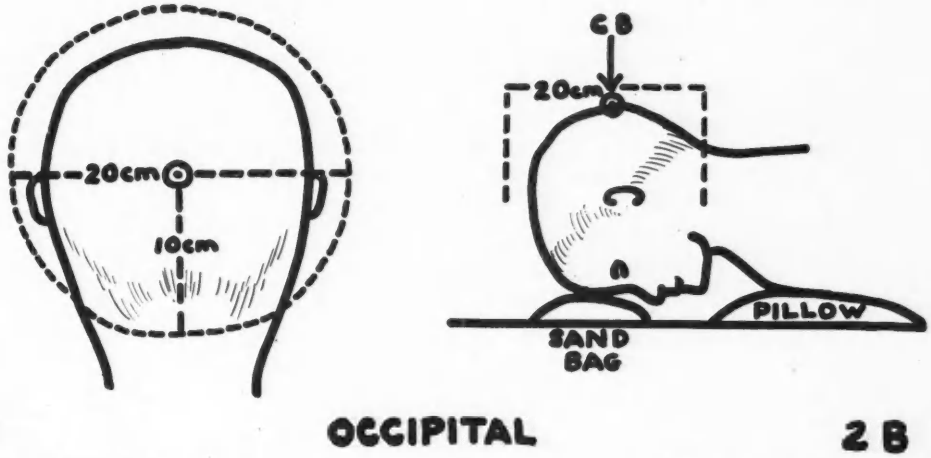

Diagram 2, A and B.—Occipital: Position of the head and direction of the central beam for irradiation of the occipital field.

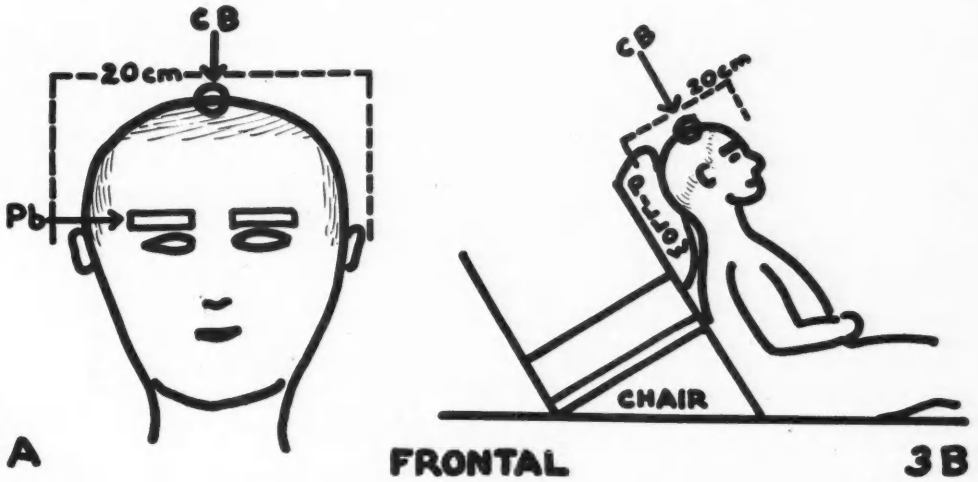

Diagram 3, A and B.—Frontal: Position of the head and direction of the central beam for irradiation of the frontal field.

RESULTS OF TREATMENT

The defluvium occurs between the 18th and 26th days following the completion of the x-ray series, and regrowth occurs in from two to four months. Cure of the ringworm is assured if epilation is complete. With incomplete epilation a cure will only be obtained if the few remaining patches are mechanically epilated and fungicidal ointment used until there are repeated negative reactions to Wood's light tests.

In our series of over 125 cases, all of which were treated by the four-point method, cures were obtained in all patients. About 40 per cent of these patients had some residual hair which was removed by their own physicians. This hair was found either in spotty areas or in frontal or occipital fringes. We do not believe it is advisable to further irradiate the scalp to remove the residual hair.

Two patients had faint erythema following treatment, one a child who originally had a diffuse inflammatory reaction. Several patients had a vague "unwell" feeling, but only three (2.4 per cent) reported troublesome nausea or vomiting during the course of x-ray therapy. Shanks,[15] who also uses the four-field technique, reports a 40 per cent incidence of vomiting after irradiation. This disparity illustrates one of the advantages of not giving all the treatments on one day. Others have reported elevation of temperature and glandular swelling; these did not occur in our series.

The majority of mothers reported no change in color or texture of the hair, but in five instances the new hair was thought to be darker, in three instances lighter, and in three others the hair came back curly.

We anticipate no damaging effects to the brain or pituitary with our technique, inasmuch as we have seen none and none has been reported to date from the many thousands of cases similarly epilated with x-rays.

We believe that our modification of the four-point method offers the following advantages:

1. Preciseness and completeness of description of technique. In practically all of the techniques which have been described to date, there is either a vagueness of the stated factors, omission of one or more factors, or discrepancies in the presentation of the method.

2. Simplicity of application. Regardless of the size or shape of the head, or the age of the patient, the same technical factors are used in all instances. No special frames or other methods of marking the scalp are required. Ordinary care in centering the patient and the field of irradiation is all that is required, instead of detailed linear and angular measurements as in the Kienbock-Adamson technique.

3. Saving of time. There is a saving of the physician's time by the use of four rather than five fields, and positioning is more rapid.

4. Safety. The four-point technique is just as effective as the five- or three-point methods in epilating the scalp and is a safer method than either of these because there is less overlapping of the treatment fields. Furthermore, we have been successful in the use of a relatively small exposure, 300 r in air per field, as also used by MacKee et al., and Molesworth and Riddle, in contradistinction to the 400 r per field advocated by Shanks, and by Schreus and Proppe. The small dosage, plus the fact that we treat but one field a day, probably accounts for the reduced percentage of systemic reactions in our series.

450 Sutter Street.

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Discussion by R. R. NEWELL, M.D., *San Francisco*

In general one should be slow to use x-ray in non-malignant conditions, for it is hard to be sure that no bad effects will follow later, even many years later. However, I do believe that x-ray epilation for intractable ringworm of the scalp is proper treatment, if done right and only once. The five-point technique does give the most even irradiation, but only if the distance is about equal to the diameter of the head (I use 15 cm.), and if the four non-central fields are centered at the edge of the hair. The temptation to center well upon to the hairy portion must be resisted. If the quality of the ray is soft enough, all areas can be treated at one sitting without producing roentgen sickness. Proper dosage (300 r to each field at the quality Drs. Hill and Mottram use) will always leave a few hairs or quite a number. Really complete epilation would make me suspect a dose twice as large as necessary or permissible. Considerable patches of residual hair do not necessarily preclude success in eradicating the disease. Under no circumstances should the scalp be irradiated again.

Discussion by H. V. ALLINGTON, M.D., *Oakland*

Doctors Hill and Mottram have done a worthwhile job in reviewing the treatment of scalp fungus infection. The time lost from school on its account and the discomfort, embarrassment and expense attendant to it make it an important disease of childhood.

The basic reason for the difficulty in clearing scalp fungus infection is the invasion of the shaft of hair by the fungus and its growth down into the follicle. Thus the infecting organism is protected from and inaccessible to topical medication. Fungicides applied locally probably accomplish little beyond controlling superficial infection and preventing spread.

Cure depends upon the involved follicles being emptied of their infected hairs. Large numbers of these are shed spontaneously and others are loosened and removed in applying medication and shampooing. Reasonably prompt loss of the infected hairs can be obtained in many cases by removal with tweezers, adhesive tape, and/or depilatory wax. Usually the greater the individual's inflammatory reaction to the fungus, the looser are the infected hairs. Thus in a kerion in which intense local allergy develops each involved follicle becomes the center of a tiny furuncle-like pustule from which the offending shaft is sloughed spontaneously.

Other conditions which favor success in treatment with local medication and mechanical epilation are: (1) relatively limited involvement; (2) ability and willingness of

patient and family to cooperate; (3) availability of a Wood's light under which infected hairs fluoresce and are more easily identified.

In other cases little inflammatory reaction is present and the infected hairs may not epilate easily. There may be extensive involvement of the scalp. It may promptly be determined that the child or parents are not going to provide the very necessary cooperation required for success with local medication and mechanical epilation. It is in these cases that epilation by x-rays is most valuable and should be used promptly. In our office we use x-rays in a little over one-third of our cases.

We use the Kienbock-Adamson five-exposure technique. We have celluloid templates with which we mark the five positions quickly and easily. We use a Coolidge tube surrounded by a shockproof shell but with a wide port and no filtration. Our factors are 80 K.V., 5 ma., and an 8-inch distance. We give 300 r measured in air to each of the five areas at one sitting. Epilation is not always complete with this technique and dosage. There is often some hair left on the occiput at the nape of the neck and at times elsewhere. It is sufficiently complete that usually a minimal amount of manual epilation or none at all is required to complete the cure. We have had no case in which we have had to re-epilate with x-rays, none in which a satisfactory regrowth of hair did not occur, and we have had no trouble with general reaction following treatment. It is our practice to use local fungicidal medication following fall of the hair and during regrowth to care for any superficial infection which might be present and to guard against recurrence.

The satisfactory results which Drs. Hill and Mottram obtain with a technique considerably different from ours show again that there is more than one way to skin a cat.

I should like to emphasize that x-ray treatment is a simple, safe and extremely valuable method of securing the fall of hair necessary in the cure of scalp fungus infection. It is available and should be used without hesitation whenever indicated.

Report of an Outbreak of Ringworm of the Scalp Due to M. Audouini

ROY O. GILBERT, M.D.,* *Los Angeles*

SUMMARY

Experience in Los Angeles County with an outbreak of ringworm of the scalp caused by M. audouini, and a review of the literature have led to the following conclusions:

Diagnosis: *The Wood's lamp is an indispensable piece of equipment in case finding. While M. audouini infection is often characteristic in appearance, there are frequent variations. Culturing on Sabouraud's medium (glucose-agar) is a requirement for positive diagnosis. Most surveys show an infection ratio of six or seven boys to one girl.*

Treatment: *X-ray epilation provides the best prospect for cure in the shortest time. Manual epilation can be employed but is less efficient and more disagreeable. Shaving the scalp every seven to ten days is helpful in preventing the spread of the infection but is not a satisfactory substitute for epilation. The most effective topical application is an ointment containing 5 per cent salicylanilide in carbowax 1500. All treatment should be conducted under trained supervision for constancy and thoroughness. Hormone therapy is in general to be discouraged.*

Control: *With proper supervision of treatment and adequate protective covering of the scalp, there need be no loss of school time after treatment has been instituted. Enlistment of the barbers of the community in refusing to serve clients with obviously infected scalps, and properly sterilizing instruments is important. Cutting instruments can be satisfactorily sterilized in petroleum oil at 100° C. without detriment to the instruments. Complete discipline must be maintained on school grounds with regard to exchange of headgear between children.*

RINGWORM of the scalp has been discussed quite comprehensively in the medical and public health literature during the past few years and has been reported from representative population centers from coast to coast. The epidemic status of the disease began on the East Coast about 1940 and promptly and progressively pursued a westward course until it eventually was recognized to have arrived in Los Angeles County in 1946.

Just how many cases of ringworm of the scalp due to M. audouini it takes to make an epidemic may be a debatable point, but the appearance of a single case should be sufficient to incite at least a mild state of alarm among those members of the community concerned with the control of communicable diseases. It requires no exhaustive search of the literature for one to be impressed with the persistent and resistant qualities of M. audouini and to be forewarned that it gets into the hair administratively as well as pathologically.

For a symptomless affliction of the childhood population this disease certainly is capable of a most diabolical upset of the adult equanimity. The child with the moth-eaten appearance to his scalp is somewhat of an assault to the esthetic senses and, in spite of the completely negative mortality rate and the absence of physical suffering, this condition is prone to arouse a most agonizing mental reaction. Parents are the first to register alarm and this is rapidly transmitted to school authorities who in turn enmesh public health workers in spreading shadows of public concern. In the meantime, the child, who is the primary victim and has been pretty oblivious to his affliction, begins to register concern over the prospect of becoming bald at a very tender age; and, if he is of school age, this develops into a matter of real concern, particularly among girls.

But the ultimate upset occurs when the nature and duration of treatment are explained. At this point rebellion, hysteria, economics, and juvenile delinquency dominate the scene. To subject the victim to complete epilation of the scalp is a prospect that is strenuously resisted by both parent and child. And yet, total epilation is a procedure that is classified as a must.

Manual epilation, although it offers the advantage of economy, seems to border on the cruel and barbaric, and rarely is performed with satisfactory thoroughness. X-ray epilation offers the most satisfactory and efficient epilating procedure when applied with an approved technique, but offers the disadvantage of expense, insufficient technical resources to supply the demand, a small but uncomfortable percentage of failures, and inadaptability to the restless, uncooperative, or frightened child. It has often been observed that x-ray epilation needs to be supplemented by manual epilation. This method is widely regarded as the method of choice, and some observers insist that an epidemic cannot be brought under control without it. A compromise

*Health Officer, Los Angeles County Health Department.

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procedure consists of shaving the scalp every seven to ten days. This, however, does not accomplish the emptying of the hair follicle that is accomplished by x-ray.

All epilating procedures require a follow-up with topical application of an approved fungicidal ointment used with thoroughness and constancy over a minimum period of several months. The ointments that have achieved the best record of success contain 5 per cent salicylanilide in carbowax 1500, or copper undecylenate. One such preparation is known proprietarily as Salinidol. It is pretty generally acknowledged that the treatment of M. audouini infection deserves the services of a trained dermatologist.

Wilson and Plunkett[18] reported the presence of the audouini type of tinea capitis in the Los Angeles area early in 1947 and warned of the imminence of an outbreak. It was about at this time that clinic services in the San Antonio district of the Los Angeles County Health Department began noticing a type of ringworm of the scalp that was exceedingly resistant to ordinary methods of treatment. We arranged for the examination of a number of cases by microscopic and cultural methods. With the positive diagnosis that ensued, immediate steps were taken to secure ultraviolet ray equipment with the Wood's filter and enough cases were found in the Bell Gardens area to impel a survey of the elementary school population of that community. A dermatologist was employed to conduct the survey and was assisted by public health nurses. During the fall of 1947, out of 2,829 scalps examined in five elementary schools with the Wood's light, 97 or 3.4 per cent fluoresced. Cultures free from contamination were obtained in 87 of these cases, of which 84 (96 per cent) were M. audouini and 3 (4 per cent) were M. lanosum. Only three cases were found in the junior high school. Experience in this survey revealed that nurses could very satisfactorily do the screening operation with the Wood's lamp and conserve the time and the effort of the dermatologist for the final Wood's lamp observation and the culturing operation.

Owing to the requirement of the Administrative Code of California under Title 5 on Education, that no pupil, while infected with any contagious or infectious disease, shall be allowed to remain in any of the public schools, it became necessary to exclude these children from school. Arrangements were made with the local school authorities for home teaching classes and the patients were referred to private medical practice for treatment. The relatively low economic level of the community resulted in very few cases coming under the supervision of dermatologists. Although an offer was made to perform x-ray epilation at reduced rate on patients with resistant cases, the limited resources of White Memorial Hospital where the treatment was to be given and the financial limitations of the patients combined to greatly limit the use of this procedure. As a consequence, the great majority of these cases were treated by topical applications on the shaven head. With the patients excluded from school, the supervision of treatment could not be satisfactorily conducted, and great reliance had to be placed on cooperation by the parents. Each patient was urged to come to the health center every two weeks for examination and inspection with the Wood's light.

A review early in January, 1948, of the 97 cases diagnosed in the survey revealed:

Returned to school as cured	18
Still excluded from school	62
Moved from the area and unavailable for interview	17
Cases treated under health department observation with Salinidol	39
Cured within 3 months	9
Still under treatment	30
Under treatment less than 2 months	15
Under treatment 2 to 4 months	15
Discovered subsequent to survey	17
Preschool cases secondary to survey cases	8

Of the 62 still excluded from school:

3 had been out less than 1 month
2 had been out between 1 and 2 months
23 had been out between 2 and 3 months
34 had been out between 3 and 4 months

Of the 18 returned to school:

6 were out less than 1 month
5 were out 1 to 2 months
6 were out 2 to 3 months
1 was out 3 to 4 months

Summary of absence from school:

80 per cent were out more than 2 months
44 per cent were out more than 3 months

This summary is of no more significance than to emphasize an already well-established observation that treatment of M. audouini infection by topical application is a time-consuming procedure extending over a period of many months.

Swartz and Peck[15] and their co-workers in the epidemic at Hagerstown, Maryland, have reported in some detail their complete success in eradication of the disease in that town in one year using topical applications without recourse to epilation by x-ray. This was accomplished without excluding children from school and by setting up a treatment center operated by trained personnel at each of the city's seven schools to ensure proper daily treatment.

It has been generally observed from the experience in other areas that x-ray epilation is the most efficient method from the standpoint of time and certainty of cure. There has been a sufficient experience to ensure its safety when the five-point technique of Kienböck and Adamson[1] is used. Cipollaro states that one radiologist can treat about 3,000 patients in one year.[3]

In view of the fact that spread of the infection is attributed to the scattering of infected hairs, it would seem that there should be no epidemiological necessity for excluding from school any patient in whom the disease has been diagnosed and brought under proper treatment. By permitting school attendance after treatment has been instituted better control can be exercised over the constancy and effectiveness of the treatment, the loss of school time

is brought to a minimum and, to that extent at least, juvenile delinquency is prevented. With a tight-fitting stocking cap to cover the epilated and ointment-covered scalp, and a headgear of aviator type for the boys and a scarf or turban for the girls, the communicability has been brought to the vanishing point as long as these precautions are observed.

Our survey of the grade school population did not progress as rapidly as we would have liked, because of the slowness with which the Wood's light has become available. The variation in cycles of the electrical current in different communities also was an obstacle. Equipment designed for use with 60-cycle electricity is not usable with 50-cycle electricity, and vice versa. When we surveyed the East Los Angeles area where the income level is relatively low and the foreign element is high, we expected to find a considerable number of cases. We were, therefore, somewhat surprised when only a single case was discovered in more than 2,000 examinations, although this community is only five miles distant from Bell Gardens where a moderately heavy infestation was found. In the Alhambra-El Monte area, which lies an additional five to ten miles away from the Bell Gardens area in the same direction as East Los Angeles, we examined 5,185 pupils in six schools. Here we discovered only two cases of audouini infection and seven cases of lanosum. Proceeding with our survey on the same radial line, we examined 2,242 pupils in eight schools of the foothill region of Monrovia and Duarte about 15 to 20 miles from Bell Gardens. Here we have found 21 cases positive to Wood's lamp examination, of which 16 were proved to be due to M. audouini. Two preschool children were found with the infection in the families of the infected school children. Up to the present time we have examined 12,493 scalps with a yield of 164 cases of M. audouini infection confirmed by culture, or 1.3 per cent. The Bell Gardens area accounted for 63 per cent of the yield.

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Discussion by L. S. GOERKE, M.D., *Los Angeles*

In the spring of 1947 the Los Angeles City Health Department, using Wood's lamps, examined 1,381 children attending five parochial schools. From this survey, 14 children with suspicious scalp lesions or fluorescent hairs were referred to our central clinic for examination by the dermatologist, and cultures were prepared for microscopic diagnosis by the mycologist. Ten (0.7 per cent) of the children originally examined were found to have tinea capitis, with M. audouini confirmed in eight (0.6 per cent). One year later, these same schools were examined by the same nursing personnel with the following results:

	1947		1948		
School	Number Examined	Audouini Cases	Number Examined	Audouini Old Cases	Audouini New Cases
Cathedral	460	0	478	0	1
Queen of Angels	282	0	300	0	0
St. Lawrence	224	5	268	2	0
St. Patrick's	135	3	193	1	1
St. Joseph's	280	0	255	0	0
Total	1,381	8	1,494	3	2

The patients were permitted to return to the parochial schools, provided they remained under treatment of a dermatologist or one of our treatment clinics and followed the recommendations and instructions of the clinics. It is interesting to note that there were only two new cases out of a school population of 1,494 children examined.

At the end of the first school survey a three-hour seminar on tinea capitis was conducted by several public health dermatologists at our Southeast Clinic, May 22, 1947, for public health personnel and private physicians. Cases of various types of tinea capitis were demonstrated by several commercial types of Wood's lamps, together with cultures and microscopic exhibits. It was shown that there is a decided difference in fluorescence by the various Wood's lights, with one type of equipment much more efficient. At present we are

using several Keese Engineering Wood's lamps, which has been our choice up to this point, although other companies have been improving their filters. To provide our district health officers with some type of black light, while procuring more efficient equipment, purple X (perflex) bulbs, costing $1.25, were used in goose neck lamps with fine wire mesh protectors. With these bulbs we picked up a few cases of tinea capitis, but probably missed many more. The first of a special floor model Wood's lamp which eliminates most of the inconveniences of lamps previously used is being tried in one of our clinics.

As Dr. Gilbert has stated, the Wood's lamp is indispensable in case finding. It is also of value in following the progress of therapy and in evaluating cures. We have learned the necessity of having an expert, preferably a mycologist, examine the cultures. The final diagnosis is sometimes delayed three weeks for a good culture to grow.

One of our clinic teams—dermatologist, laboratory technician, nurse and clerk—conducted demonstrations for school physicians and nurses. Since then continuous surveys have been in progress in the public schools and these have resulted in the discovery of 115 cases.

One hundred eighty-five cases were diagnosed in the Los Angeles City Health Department clinics during the first year's experience with tinea capitis; 25 cases were in preschool children (child health clinics, outside referrals, family contacts); 24 were in children attending parochial schools, and 136 were in pupils at public schools.

Most of the cases were found in the Central, Watts, and Southeast areas, which are high population density, low income areas. This is where we have concentrated the case finding program. Other areas are involved, but at the present time the extent is undetermined.

The age of the patients ranged from 2 to 12 years, with males predominating five to one. Duration of the infection ranges from two weeks to one year. Epidemiological investigation as to barber shops, theatres and churches has revealed no common source of infection.

As Dr. Gilbert stated, x-ray epilation provides the best prospect for cure in the shortest time. However, this service is difficult to obtain. The Los Angeles Dermatological Society appointed a committee to investigate the subject and to meet with the radiological section of the County Medical Association. Extreme caution because of extreme sensitivity to the medicolegal aspect was very evident. It was decided after considerable discussion that the procedure was safe and that if a precedent were established legal hazards would disappear and x-ray clinics to meet the need would follow. White Memorial Hospital has set the precedent, but the free, part-pay x-ray epilation clinics or services, where the greatest need exists, have not followed. Therefore, the health department has the responsibility of operating daily clinics, not only for diagnosis, but for treatment.

Factors Influencing the Choice of Hearing Aids

WILLIAM T. DUGGAN, M.D., *San Francisco*

SUMMARY

Recently the problems of the hard-of-hearing have been receiving more attention. Laboratories for proper treatment and diagnosis are being developed. The Army and Navy rehabilitation centers have made great strides in the advancement of the problems of selecting hearing aids and training in their use. Hearing aids have improved greatly since the advent of the midget vacuum tube. Newer and better models are continually being produced. Fitting of aids to an audiogram is not practical as yet. Bone conduction oscillators are inefficient and seldom indicated. The conduction type of hearing impairment does not usually present much of a problem as far as selection of an aid is concerned.

Anyone who has difficulty in hearing ordinary conversation should think seriously of wearing an aid.

A WAVE of enthusiasm is spreading throughout this country regarding the diagnosis and treatment of impaired hearing and allied problems. Some of the reasons are the government-sponsored research on the subject in conjunction with the Army and Navy rehabilitation projects, the recent improvements in hearing aids, and the wide publicity given the fenestration operation. It is hoped that this interest will continue so that otologists will have a more thorough understanding of the subject. Then, and then only, shall we be in a position to treat, or direct into the proper channels, those with hearing difficulties.

Generally speaking, we are all familiar with the diagnosis of the various types of hearing impairments. We also know how to treat those whose difficulty is amenable to medical or surgical procedures. Unfortunately, so far a large percentage of cases do not respond to any known treatment. For the majority of persons in this group the only salvation is the hearing aid. These are the individuals who need more help from otologists than they are getting. At least we should be well enough informed that we may intelligently advise them regarding the proper choice of an aid.

There are two schools of thought regarding the choice of aids. At one extreme are those who believe that individual fitting is unnecessary, that an instrument of proper construction will meet all usual needs. At the other extreme is the belief that each case calls for an especially chosen instrument. Judged on the basis of results, the latter belief certainly overwhelms the former. A resumé of what has been accomplished by the Army and Navy programs, along with the Psychoacoustic Laboratory at Harvard and the Central Institute of the Deaf at St. Louis, substantiates the conclusion that careful consideration of numerous instruments or combinations of instruments is necessary for the best results.

As a result of the highly satisfactory work that these agencies have accomplished, many new acoustic laboratories are springing up throughout the country. The purpose of these laboratories is to give the otologist a much more comprehensive and complete auditory evaluation of the individual with hearing defects and to apply proper therapeutic measures which the otologist is not equipped to render—for example, the fitting of hearing aids, instructions in the use of them, and the treatment of the psychological problems involved.

Anyone observing, at any of these institutions, patients going through the various steps for the selection of aids, could not but notice the tremendously beneficial psychological effect that is produced. Thus, not only is the most desirable instrument chosen, but also the proper mental attitude for satisfactory use is attained.

The hearing aid problem, of course, is only one of the many functions that these laboratories deal with. Lip reading and speech training, as well as research work, are being carried on in most of them. With this type of program under way, we should be in a position in the very near future to render a more encouraging service to countless thousands of hard-of-hearing persons.

Otologists fortunate enough to practice in a community where one of these laboratories is in operation and available to private patients need not worry about what to do with the individual who needs an aid or who needs an accurate evaluation of a hearing problem. In that case the physician, after completing the physical part of the otologist's examination, refers the patient to the laboratory. A brief report of his findings and recommendations accompanies the patient. No patient is accepted unless referred by an otologist or a physician acquainted with aural disease.

In 1940, a survey by Day[3] stated that 75 per cent of all hearing aids purchased were discarded. Three years later, Hughson and Thompson[4] carried on another survey and found that in those cases where the individuals were properly examined, tested, and measured by thorough speech reception tests, the number of satisfied users was increased to 80 per cent. A later survey by Thompson[5] at the Naval

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Hospital in Philadelphia showed that 94 per cent of those fitted properly with aids were continuing to use them.

Hearing aids have improved greatly since the advent of the midget vacuum tube in 1938. There is still a great deal of room for improvement in them and changes are being made continually for the better. Batteries which are much smaller and many times more efficient have been developed. The present aids were built to fit the only types of batteries then available. The newer batteries will be about one-fifth the size and will last many times longer. Instruments are also coming out with entire electronic circuits "printed" in electrically conductive "ink" on small cards. This will cut down even more on size and reduce the amount of labor necessary for assembling. Vacuum tubes have been made about the size of a pea, although they are not practical for hearing aid use as yet.

Who will be benefited by wearing an aid? It has been said that anyone who has difficulty in hearing ordinary conversation should think seriously of wearing an aid if, after competent examination, no other treatment is more feasible. It is interesting to note that at the Naval Rehabilitation Center "only 6 out of 3,000 persons were so hard of hearing that they could not profit by an aid and training in its use." Not only will the wearer of an aid be benefited if the aid improves his hearing, but also his family and friends will be helped greatly by being relieved of the annoyance and embarrassment of having to repeat and shout.

About 90 per cent of the hearing aids now in use are of the vacuum tube air conduction type. A few of the manufacturers are still distributing aids of the carbon type, although there is rarely any justification for their use. The bone conduction receiver is still occasionally indicated.

Modern vacuum tube aids are quite similar, one to another, in construction and design, although of course there are some differences in size, weight, workmanship, appearance, and electro-acoustic properties. Each instrument consists of a microphone, an amplifier with two, three, or four midget vacuum tubes, condensers, resistance coils, volume and tone controls, a receiver or a bone oscillator. An A and a B battery are required. The A battery is 1½ volts and the B battery from 15 to 45 volts. There is considerable difference in the tonal quality of most of the instruments manufactured by the various companies. This is partially accomplished by varying the "hook-ups" of the component parts.

TWO TYPES OF RECEIVERS

There are two types of receivers used, the magnetic and the crystal. The magnetic is usually a little larger and heavier and is better for reproducing lower tones. It is preferred for patients whose hearing impairment is of the flat curve loss or conductive type. The crystal is more commonly used because it is smaller and lighter and it is better for amplification of the higher tones, although it does have more distortion and objectionable noises.

There are about 40 manufacturers now producing aids. Fewer than half that number were accepted by the Council on Physical Medicine of the American Medical Association in 1947. Most of the manufacturers have various models with different characteristics. Some transmitters are designed for only one receiver while others can be used with as many as five different receivers. Various B battery voltages are used. The total number of possible combinations, according to the investigators at the Philadelphia Naval Hospital, is well over a thousand.

At the Army and Navy rehabilitation centers, and at the other recognized hearing centers, only those aids which are accepted by the Council on Physical Medicine of the American Medical Association are recommended. This council renders a valuable service by keeping both the profession and the hard-of-hearing patient informed as to which instruments merit consideration for purchase. In order for an instrument to be accepted by the Council, the manufacturer must submit a sample stock instrument which is subjected to extensive and rigid tests by an impartial acoustic physicist. Engineering data must be provided to prove all claims for satisfactory operation. The instrument must be capable of increasing the intensity of sound by at least 30 decibels between 300 to 3,000 cycles. Its inherent noise level must not be excessive. All materials and workmanship in its manufacture must be of the highest quality. The manufacturing firm is responsible for "ethical merchandising practices, financial dealings and contracts of its agents." Misrepresentation and exaggeration of claims in advertising have frequently been the reasons why some of the most highly publicized instruments are not acceptable or have been removed from the accepted list.

The author does not agree with the Council entirely, especially in its acceptance of an aid which is sold by mail only. One of the largest manufacturers makes not only all its sales of instruments by mail, but also all sales of batteries to be used in these instruments. This firm changed the battery terminals so that standard batteries cannot be used. Local suppliers of batteries have remedied that situation, however, by making terminal adapters, thus saving the wearers much inconvenience and expense. Another objection to the Council is that it takes many months to give approval of new instruments. Generally it may be considered safe to recommend a new instrument made by a reputable manufacturer if previous models by the same maker have been accepted.

Fitting a hearing aid to an audiogram is known as "mirroring" or "selective amplification." So far, it has proven impractical. The instruments now available are not flexible enough in adjustment to permit selection of frequency amplification except in a very narrow range. Sometimes losses are missed by the audiometer because they occur between the octaves recorded. The acoustic properties of an aid are influenced considerably by the "body baffle" effect of the patient himself. That is, the tonal quality of an instrument is quite different when tested

alone and when tested in contact with or in close proximity to the wearer's body. Furthermore, those who have been hard-of-hearing for a long time develop a peculiar "speech hearing" pattern which cannot be corrected by selective amplification alone. However, the audiogram is a very important and necessary adjunct for proper diagnosis, especially as to quantity and type of hearing loss.

There is no longer much controversy over the relative merits of bone conduction and air conduction instruments. Air conduction receivers have definitely proven their superiority. Not only are they far more economical, but they are more efficient even in those cases in which the patient gets a greater volume of sound by bone conduction than by air conduction. The bone conduction receivers do not amplify adequately the higher tones so necessary for distinguishing consonants. Moreover, much more power is required for their operation, which means that the instruments will be bulkier and more expensive to operate. About the only cases in which their use is justified are those in which the patient has bilateral suppurative chronic otitis.

For the individual with hearing loss caused by impaired conduction of sound, practically any of the accepted aids will prove satisfactory. The problem in most of these cases is to persuade the patient to wear an aid. This problem, fortunately, is gradually diminishing, probably because it has been estimated there are almost a million persons who are now wearing aids in this country. For those who are not concerned with vanity, the conspicuousness is often an asset. Many people wear aids to indicate their infirmity in order that people will speak more loudly and distinctly to them.

Carhart and Thompson[1] have divided the process of fitting aids into steps which are simple and logical. The following is the procedure they suggest:

1. Thorough medical and audiometric study of the patient.
2. Decision regarding the feasibility of a hearing aid and the type of instrument to be specified.
3. Procurement of an individual ear-piece wherever air conduction fittings are to be tested.
4. Preliminary selection through appropriate screening of a manageable number of fittings which are particularly promising for the patient.
5. Detailed testing to discover the help which the patient receives with each instrument surviving the preliminary selection.
6. Recommendation, on the basis of test results and the patient's special problems, of the instrument best suited for him.
7. Auditory training designed to adjust the patient to the instrument chosen.

To carry out these suggested steps, the services of an acoustic laboratory are of course necessary.

If the patient does not have convenient access to one of these laboratories, he should get the recent book edited by Hallowell Davis,[2] entitled "Hearing and Deafness." Although primarily a guide for laymen, it should be read not only by every hard of hearing or deaf person, but by every otologist as well.

With rare exceptions, a hearing aid salesman is, of course, not a disinterested or impartial judge of what is best for the individual. For that reason, there is a chapter in the book just mentioned in which the reader is told how to determine quite satisfactorily the various features of performance he should look for in an aid. The tests described can be made at home or on the dealer's premises.

The following are the features of performance discussed in that chapter:

1. Tolerability.
2. Intelligibility of ordinary speech.
3. Intelligibility of faint speech.
4. Intelligibility of difficult words.
5. Freedom from internal noise.
6. Aesthetic "quality."
7. Intelligibility of speech under difficult conditions.

A number of instruments should be tried and an accurate score of each one of these features should be kept. The test words, sentences, and method of scoring are all given in the book.

Besides these features of performance, other important factors listed are:

1. Availability of dealers.
2. Acceptance by the Council on Physical Medicine.
3. Service, batteries, and earmolds.
4. Size, cost, and convenience.

For obvious reasons an aid should never be purchased by mail. One should be selected from a reputable dealer or representative in the community in order to facilitate instructions in using, servicing, and repairing. A so-called universal ear-piece should not be used. Any dealer can arrange for the making of an individually fitted ear mold to which any of the present models of receivers may easily be attached. Thus, serious irritations to the soft tissues of the ear, and leakage of sound between the canal and the mold, can be avoided. This leakage, if present, is responsible for an annoying "squeal" which is called "feed back" because of the receiver transmitting sound back to the microphone. The better "single unit" instruments do not vary significantly in size, but there are wide differences in cost. Therefore, if the performance and other features are about the same, there is no reason why the most economical aid should not be chosen.

Battery cost and consumption should also be given thoughtful consideration if one is interested in limiting the expense of operation. The old zinc cells are far more economical than the newer mercury types, although the latter have a more uniform output of voltage than the former.

There is a tendency for the hard-of-hearing person to prefer the smoother and more mellow tones of an instrument which does not amplify the high tones sufficiently. However, for the sake of intelligibility the consonant frequencies, although not so pleasant, are more important than the vowel fre-

quencies. For this reason crispness of sound, rather than mellowness, should be the guide.

In determining whether to attach the aid to the right ear or the left, Thompson suggests: "If there is an average moderate loss and the patient can still use the telephone satisfactorily, the ear not used in telephoning is used; if there is a disparity between the ears, for example if one ear has a 40 decibel loss and the other a 70 decibel loss, the better ear is used; and likewise, if there is a bilateral extensive loss the better ear is used." In some cases of course there will be unusual problems requiring individual solution.

490 Post Street.

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Discussion by WALTER P. WORK, M.D., *San Francisco*

There is a healthy movement afoot, as pointed out by the author, for the establishment of aural rehabilitation clinics in this country for civilian use. I urge all otologists to become familiar and intimately associated with these centers if possible. It is not enough to refer a patient to one of them and then dismiss him from mind. The otologist must help lead the patient through the pitfalls encountered in using a hearing aid and further must act as a counsellor and physician.

In communities where there are no hearing aid clinics, the otologist must assume more responsibility. Specifically, the otologist must test hearing and determine the need for a hearing aid. He should also settle the problem as to whether the hearing aid should be of the air or bone conduction type. Further, the ear to be fitted can be determined and a standard acrylic ear insert with the universal bushing may be fabricated. This is important, for then the patient is free to go to as many hearing aid companies as the otologist directs. When a hearing aid is first tried, the patient must go through an initial period of learning to listen to amplified speech and sound. In the observation of some 4,000 patients, it was found that this period is quickly passed. No hearing aid should be judged before there have been several hours of practice. In order to get a patient past this learning phase, he may be directed to go to a hearing aid company and try out a hearing aid on successive days. The type of hearing aid during this phase is not important. After this initial period of learning, the patient is then advised to try to determine which of four or five gives him the best acoustical response. This process of shopping is one of the weak links in the whole process of procuring a hearing aid. Once the hearing aid that gives the best acoustical response is found, the salesman and the patient should return to the otologist's office, where the salesman should demonstrate why this aid is the one for the patient. During this demonstration the otologist must be alert to the following:

1. The ability of the patient to respond to speech intelligibility tests in quiet and noise. (Noise may be introduced from a Barnay noise box at various distances from the hearing aid microphone). This determines the ability of the hearing aid to shut out background noise.

2. The reserve power of the instrument. This may be noted by the position of the volume control at comfortable loudness settings.

3. Sound localization.

4. The patient's tolerance to loud noises. It may be predicted, if there is low tolerance, that the patient may require special advice regarding the use of the hearing aid.

5. The quality of the hearing aid and the service policies of the company selling it.

Once the hearing aid is purchased the patient must be advised regarding auditory training which is deemed most important. Auditory training consists of two phases:

1. Instructions regarding the use and care of the hearing aid.

2. Improving listening ability—that is, retraining residual hearing or retraining the patient's sound memory.

The first phase of auditory training is usually taken care of by booklets and pamphlets made available through the hearing aid company. The second phase must be handled by a definite schedule of listening hours. The patient must be encouraged to use the new aid in a succession of life situations, each one being more complex.

The otologist must advise the patient regarding lip reading instruction and speech correction if the latter is needed. Lastly, the otologist may have to act as a psychological and vocational counsellor. This is the role the otologist must play if no hearing aid clinic is available in his community. Even if a clinic is available, the otologist's duties as pointed out previously should not end when the patient is referred to such a clinic.

There are many phases of this subject that cannot be dwelt upon in this discussion. However, I would like to point out that most discussions such as this overlook the child who is hard of hearing or deaf, and at the same time to urge that it is feasible to fit a young child with a hearing aid if that child is properly guided.

Dr. Duggan spoke of "mirroring" the audiogram. It has been shown by acoustical research with the master hearing aid, that either straight line amplification or amplification that rises 3 to 6 decibels per octave is the best acoustical response that can be obtained in a hearing aid. When this is accomplished by all hearing aid companies, fitting problems will not be so great.

Early Ambulation in Obstetrics and Gynecology

STIRLING PILLSBURY, M.D., *Long Beach*

SUMMARY

Early ambulation has been a large factor not only in decreasing many of the complications that may follow childbirth and gynecological operations, but in reducing the time of convalescence.

SINCE the dawn of history, early rising after childbirth has been practiced by nearly all primitive races and by others who, through necessity or otherwise, have been unwilling to accept the teachings of the medical profession.

Owing to the greater complexities of child bearing in modern civilization, and perhaps in recognition of a decline in the ruggedness of the human body, the medical profession long accepted as routine the keeping of women in bed for various lengths of time following the delivery of a child. This was done in the conviction that it was a means of preventing serious complications and was for the future good of the individual. Medical teaching was that rising too early after parturition was liable to dire consequences such as excessive bleeding, infection, embolism, and permanent herniation through the vaginal tract.

Most physicians, however, have seen patients who, through necessity or disbelief, did not remain in bed the accepted length of time, but who got up and carried out their usual duties a day or so following childbirth; and it has been surprising to note that these patients, for the most part, convalesce normally.

Moreover, it has been noted that animals are able to resume their usual habits soon after bearing offspring, or after surgical operations, and that complications in them are rare.

Early ambulation can be defined in various ways. Ambulation, as the term is used in this presentation, means getting out of bed and moving about. Early, as defined by various individuals, is from six hours to four or five days after delivery. It should be emphasized that early ambulation distinctly does not mean early resumption of usual household duties or others requiring strenuous exercise.

For several years certain members of the medical profession have been reporting excellent results in allowing patients to walk and to carry out various exercises out of bed very soon after childbirth and surgical operations.[5] During the last ten years, there have been many reports[2, 4] of series of cases in which early ambulation was permitted. Because of extremely crowded conditions in hospitals in recent years, physicians have been urged to send patients home early. This, together with a shortage of nursing help, has tended to encourage patients to do more for themselves and to get out of bed much earlier than was the custom.

The author's interest in this subject was aroused early in 1944 when he had occasion to observe two obstetrical services that were conducted in separate Army hospitals caring for approximately the same number of cases. The patients in one hospital were allowed to get out of bed and walk within 24 to 36 hours following delivery, while those in the other were required to remain in bed the conventional eight days and were not discharged until the tenth day.

At the end of approximately a year's time, the results of these two series were compared. All cases during this period were carefully, even skeptically, followed for any evidence of complications or poor results which might be attributable to early ambulation. It was found, however, that the women who were permitted to get out of bed early had a much shorter and less complicated convalescence and a greater sense of well-being upon leaving the hospital. A lower morbidity rate was noted among the women who had been permitted early ambulation. No cases of thrombosis were noted among them, although there were several cases among the patients who were required to remain in bed for a longer period. Perineal wounds healed as readily in patients permitted early ambulation as in those who remained longer in bed, and no greater evidence of vaginal herniations was noted.

Early in 1946, early ambulation was instituted at Seaside Memorial Hospital in Long Beach. At first the procedure was prescribed by only a few of the physicians treating obstetrical patients in the hospital, but in time others adopted it with the result that an increasing percentage of patients were permitted early ambulation. Concurrently there was a decline in maternal morbidity from 3.7 per cent in 1946 to 2 per cent in 1947. During this period there were 4,178 deliveries including cesarean sections without a maternal mortality.* Although no doubt there were other factors contributing to these low figures, early ambulation must be given its share of the credit. There was only one known case of throm-

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*Since this presentation was prepared, the number of deliveries without a maternal death has increased to 5,427.

bosis during this period, and it occurred in a patient who did not get out of bed until the fifth day.

The routine at Seaside Memorial Hospital has been to have the patient dangle her feet over the edge of the bed several times a day 12 hours after delivery, to have her walk around the room several times after 24 hours, and walk down the hall and have bathroom privileges after 48 hours. She is also encouraged to move about in bed as much as possible at all times. We have set 24 hours as the maximal time for remaining in bed because it has been pointed out by several authorities that thrombosis of the extremities usually occurs within two to four days following injury of the tissues and stagnation of the circulation.

By early use of the muscles, circulation is increased throughout the body, which accelerates healing and early return to normal functions of both muscles and pelvic organs. It is felt that the increase in circulation is a great factor in early involution of the uterus, which reduces the hazard of infection and hemorrhage in that organ. In addition the upright position gives better drainage of lochia from the uterus and from the vagina. Early rising encourages deeper respirations and increases circulation through the lungs, thereby decreasing chances of pulmonary complications. Perhaps the greatest reward, however, is the often stated sense of well-feeling on the part of the patient. All patients who have tried early ambulation are enthusiastic about it, and all who were multiparae have said the convalescence following this procedure was much more satisfactory than that following their previous pregnancies.

We have made it a rule that no patient will be required to conform to the previously mentioned time schedule for early ambulation, but we do require that patients who do not get out of bed within the first 48 hours must remain in bed the allotted eight days before they are permitted to walk. This is done to prevent liberation of emboli from thrombi formed early in the postpartum period, and to permit recognition of the signs and symptoms of a thrombus, which usually occur four to eight days postpartum.[1, 3]

Results of early ambulation in gynecology are almost parallel to those in obstetrics. For years, many surgeons have advocated leg exercises after all kinds of operations. In the past few years, surgeons have been encouraging patients to walk within a few hours after major surgical procedures. In this regard it is appropriate to remind ourselves of the results which have been obtained in operations on animals, with no effort made to keep the animals quiet afterward. Also, we have known for years that convalescence after operations on young children was shorter and less complicated than the convalescence of adults. Undoubtedly contributing is the fact that children cannot be kept quiet in bed after operations and have therefore, in effect, practiced early ambulation in bed.

On our service, patients who have been operated upon are permitted to follow the same routine as obstetrical patients. Here again patients who have undergone repeated cesarean sections offer the information that convalescence is more satisfactory with early ambulation. Because of the prejudices built up over a long period, it is sometimes hard to convince patients that it would be to their best interest to exercise while in bed, and to get out of bed early. But in my experience all patients agreed, after the first one or two attempts at getting out of bed, that they felt much better than they expected to and were glad they had made the effort.

Increase in circulation of the extremities, in the abdominal wall, and in the abdominal and pelvic contents, has been a large factor in preventing a great many of the common complications and discomforts following operations. Gas pains, distention, nausea, and vomiting, have practically become something of the past. It has been stated on several occasions that early movement of the abdominal contents helps prevent adhesions and that increasing the circulation is a factor in the healing of injured tissues and in the quicker healing of abdominal wounds.

We have noted a marked reduction in the amount of sedation needed for patients who are allowed early rising. Strong sedation is rarely needed after the first 24 hours; this, we feel, is a great factor in the prevention of ileus.

Contraindications to early ambulation are few, and some which were formerly considered valid have been discarded. We feel that a patient with a temperature of 101° F. or over should not be allowed out of bed, at least not until the cause is known. Some physicians, however, believe that this is not a reason to keep patients from early ambulation; on the contrary, that walking may help reduce the fever. Hemorrhage, although rare, is certainly a reason for keeping the patient quiet.

There is a great deal of difference of opinion as to whether patients who have undergone surgical repair, either at the time of childbirth or as a separate operation, should be encouraged in ambulation. It is reasonable to believe that in some instances early ambulation might cause sufficient increase in abdominal force to break down a repair of herniation through the vagina.

The fact that the patient feels so well in a few days following delivery or operation leads to the question, "Why can't I go home?" Many patients wish to leave the hospital the second or third day following delivery, and even three or four days following major operations. And while patients who have been permitted early ambulation can safely leave the hospital several days earlier than they might otherwise, complications such as thrombosis, infections and wound separations still do occur in such patients, and for that reason they should remain under observation until these dangers are past. Moreover, patients must be warned repeatedly against too vigorous exercises and against doing too

much until the body has had time to recover and wounds are safely healed.*

419 Professional Building.

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Discussion by ROBERT D. DUNN, M.D., *Palo Alto*

Doctor Pillsbury has presented a paper on an extremely important subject.

The subject with which Dr. Pillsbury has dealt is important not only because of the shortness of hospital beds but also because of the implication of possible reduction of complications in postpartum patients. In anticipation of this discussion, I reviewed a thousand consecutive obstetrical cases from my private records of 1947 and a similar number from 1941 and 1942. These are not exactly comparable, as in the earlier group relief of pain was obtained by analgesia and in the recent group caudal anesthesia was used in most cases. In the early group there was a morbidity of 1.8 per cent. In one-third of these cases morbidity was due to endometritis, or intra-uterine infection. In the more recent series there was a morbidity of 1.2 per cent—not a significant difference in the morbidity, but significant, I think, in that there was only one endometritis. Most of the morbid conditions were due to breast infection, which I think is not influenced by early ambulation. Unfortunately from the standpoint of comparative data, there were no cases of embolism in either group.

I think we may definitely say that early ambulation in obstetrics lowers the incidence of postpartum intra-uterine infection.

The well-being of the patient is extremely important in this type of postpartum care, but there is one disadvantage which I would like to emphasize. When the patient is allowed to go home early, often the family considers the patient perfectly well and the time of convalescence finished, so that some patients immediately pick up their household duties and over-do. Thus, they become completely tired out and it takes them some time to recover.

*As to the legality of early ambulation, Louis J. Regan, M.D., LL.B., legal counsel for the Los Angeles County Medical Association, has advised that in general the concept is that if the procedure is advisable medically it is defensible legally. This aspect is mentioned because the author has been informed that several actions are pending for recovery for damages alleged to have occurred as a result of a patient's having been allowed to leave the hospital too early.

Leukocytes in "Virus X" Infection

CARROL S. SMALL, M.D., and G. GORDON HADLEY, M.D., *Loma Linda*

SUMMARY

Study of blood taken from patients with the recent "Virus X" "flu" syndrome showed slight leukopenia and the presence of abnormal lymphocytes, the most characteristic of which were those showing basophilic cytoplasm. These cells, often called Turk cells, and which the authors have termed "toxic" lymphocytes, are similar to those found in other virus infections.

DURING the recent epidemic of respiratory infections widely publicized as "Virus X" infection, but actually traced to type A influenza virus in most of the infections studied by the California Department of Public Health,[2] the authors of this presentation were intrigued by the bizarre lymphoid cells observed in smears of blood taken from patients who had the disease. This prompted a systematic study of the blood picture of these individuals, most of whom were medical students, nurses, and hospital employees. A series of 50 cases of this influenza syndrome, seen at the Loma Linda Sanitarium and Hospital between November, 1947, and January, 1948, is here reported, with emphasis on hematologic findings.

All these patients complained of sore throats, backache, weakness, and general malaise. Their ages varied from ten months to 67 years, with an average age of 31.4; 11 were male, 39 female. Physical examination revealed injected pharynx in many, and occasional basal rales in a few of the patients. Cases in which there were complications which would be known to alter the blood picture are not included in the series. All patients were discharged well after a few days, and no later complications have been reported. All had, as routine procedures, erythrocyte and leukocyte counts, differential leukocyte study, and hemoglobin determination. On the blood smears (stained by Wright's method) at least 200 cells were routinely classified, and in subsequent study at least 500 were observed on each film.

The total leukocyte counts ranged from 2,250 to 10,450 per cu. mm., with an average of 6,560—somewhat higher than had been expected (see Table 1). The average differential count was: polymorphonuclear neutrophils, 45.1 per cent; stab forms, 11.2 per cent; lymphoid cells, 32.8 per cent; eosinophils, 1.5 per cent; monocytes, 9.8 per cent; basophils, 0.4 per cent.

From the Department of Pathology, College of Medical Evangelists.

The lymphocyte types which especially attracted attention were as follows:

I. Cells, up to 18 microns in diameter, with dark blue opaque slightly uneven or granular cytoplasm, and with nucleus about two-thirds the diameter of the cell. The nucleus was dark purple, and the chromatin the usual "lumpy" texture of the adult lymphocyte. No azurophil granules were observed in this type. Similar cells are often seen in the blood of patients with German measles, infectious mononucleosis, and measles.[1, 3, 6]

Some of these cells had a distinct semilunar pale area in the cytoplasm adjacent to the nucleus. In this one respect they resembled the "plasma cell," but the nucleus was not usually as sharply eccentric as in a typical plasma cell[1] (see Figure 1).

TABLE 1.—*Range of Leukocyte Counts in Patients in Series*

Leukocyte Counts	Percentage of Cases
Under 4,000	2
4,000- 5,000	22
5,000- 6,000	22
6,000- 7,000	14
7,000- 8,000	16
8,000- 9,000	12
9,000-10,000	6
Over 10,000	6

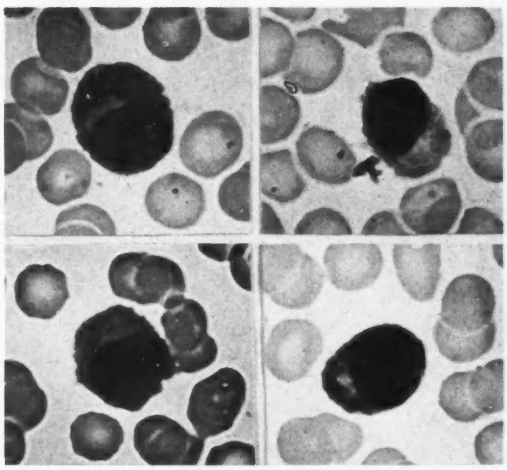
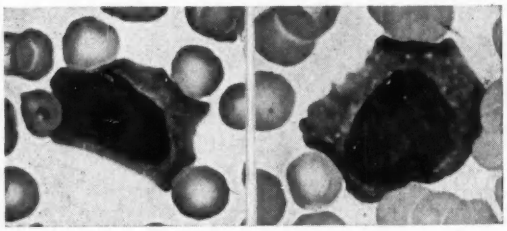


Figure 1.—Cell at upper left shows definite basophilic cytoplasm with an eccentric nucleus containing clumped chromatin. There is a perinuclear halo.

Cell at upper right shows features similar to A except the chromatin is more clumped and the semilunar area around the nucleus is lighter.

Cell at lower left shows basophilic cytoplasm.

Cell at lower right shows eccentric nucleus with pale semilunar area in the basophilic cytoplasm.



Left, Figure 2; right, Figure 3.—Figure 2 shows a type II cell with a tendency to fold around adjacent erythrocytes. The type III cell in Figure 3 shows a tendency to cytoplasmic vacuolation and a general foamy appearance.

II. Cells as large as those pictured in Figure 1, with dark-staining lumpy nucleus, but with pale "transparent" blue cytoplasm, often much darker at the cell periphery. These cells seemed to have very low cytoplasmic viscosity, for they flowed in among the more rigid erythrocytes on the slide, and easily conformed to irregularities in the contour of adjacent objects. The nucleus of these cells was usually not as dark as that of type I cells (see Figure 2).

III. Cells with any of the nuclear characteristics heretofore described, but with distinctly vacuolated or fenestrated cytoplasm. These often lacked the limpid transparency of cytoplasm of type II, and might be "hazy" or turbid with tiny reddish granules like those in monocytes (see Figure 3).

In our laboratory the general term "toxic lymphocyte" has been adopted for "type I" as previously described. As thus used, the term indicates a lymphoid cell which labors under the burden of some toxic or infectious influence, but is not a lymphoblast, and is not necessarily immature. The eponym "Turk cell" is often applied to such cells, but a more morphologic name[4, 5] was preferred.

In a study of the blood films in this series, it was easy to find what appeared to be cells in all stages in the transformation of lymphocytes to "plasma cells." However, whether that is fact or merely appearance, the authors are not prepared to say.

Although it cannot be said that the previously described lymphocyte aberrations are diagnostic of influenza or any other one clinical syndrome, they do indicate some toxic process, usually a virus, or at least a non-bacterial, infection. They are quite frequent in children in a great variety of diseases, and less common in adults. In this group are many cells which are borderline types and no doubt would probably be called large lymphocytes in an otherwise normal differential count.

In the blood specimens from 49 patients in the series, some or all of the types described were observed. Type I cells were found in 23 cases and on an average made up 2.4 per cent of the total differential count. Type II cells were found in 39 cases, and type III cells in 49 cases.

The average percentage relationship of abnormal lymphocytes to total lymphocyte count was as follows: Type I, 3.4 per cent; type II, 18.4 per cent; type III, 31.7 per cent.

These three cell varieties emphatically are not described as distinct types. They are simply prominent "lines" in the continuous spectrum of variations in lymphoid cells. Nuclei vary from the pronounced cartwheel or "Radkern" style of the plasma cell to the fine lacy structure of the monocyte. However, no "blast" cells were seen—that is, none with fine-textured embryonic nuclei — and none contained nucleoli.

In some cases in the series it was impossible to categorically exclude the diagnosis of infectious mononucleosis by the study of the blood smear alone. When such difficulty arose, a negative "Paul-Bunnell" heterophil antibody reaction and the absence of lymphadenopathy and splenomegaly was accepted as sufficient to rule out mononucleosis.

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CASE REPORTS

- Renocolic Fistula
- Meningovascular Myelitis in Early Syphilis

Renocolic Fistula

H. VERRILL FINDLAY, M.D., *Santa Barbara*

RENOCOLIC fistula was reputedly described by Hippocrates. Rayer[10] in 1841 gave a clear description of this lesion and presumed that it followed a long standing renal infection with probable perirenal abscess. No better theory of the production of this lesion has been produced since Rayer's time.

In spite of the long history of our knowledge of this lesion reports of cases are relatively rare. Mertz,[5] in 1931, collected from the literature reports of numerous cases of upper urinary tract fistula to show the relative frequency of occurrence at various sites. He found reports of two renogastric, three renoduodenal, nine renobronchial, and 29 renocolic and ureterocolic fistulae. By way of contrast and to show the greater prevalence of lower urinary tract fistula, it may be noted that Fowler[2] in 1928 reported 500 cases of vesicointestinal fistula. Vermooten and McKeown,[12] reviewing the literature in 1933, found reports of 26 cases of renocolic fistula. Ratliff and Barnes[9] in a review in 1939 found 11 more. Pedroso, Anglada and Pedroso[8] in 1940 reported an accumulated total of 43 cases, including two of their own. A cursory review of the literature since then shows Markowitz and Katz[4] have reported two cases, Minuzzi and Torresi[7] one, and Miller[6] one and Liebich[3] one. This paper adds one more, making a total of 49 cases reported to date.

As its name implies, a renocolic fistula is one connecting a kidney and the colon. Rayer was of the opinion that the lesion was primarily the result of chronic renal inflammation which produced a perirenal abscess that ultimately ruptured and drained into the colon.

Study of the reports of individual cases leads to the conclusion that this is the way most of these fistulae are produced. The lesion is always primary in the kidney. No case has been recorded with an initial bowel lesion. As the colon at the region of the hepatic and splenic flexures is in intimate contact with the anterior surface of either the right or left kidney, rupture of a perirenal abscess into the colon is understandable. A surprising phenomenon is that the fistula passes through the wall of the cortex rather than the wall of the pelvis of the kidney.

Ratliff and Barnes, in reviewing reports of 37 cases, noted the following associated and probable causative lesions: renal tuberculosis in five cases, renal calculi in 14, and pyelonephritis in 18. No case in which there was associated malignant growth in the kidney was found by them, and they found no case in which the primary lesion was in the bowel.

The patient's history and results of urinalysis may suggest renocolic fistula, but diagnosis may be confirmed only by retrograde pyelograms. A patient who has this disease usually appears debilitated and is chronically ill. Frequently there is a history typical of perirenal abscess, with symptoms suddenly subsiding but blood-streaked stools appearing concomitantly. There are not, in the typical case, constant symptoms of bowel disorder.

Findings upon physical examination may not be characteristic or striking except for evidence of chronic sepsis. Urinalysis usually discloses marked pyuria. Intravenous pyelograms do not constantly nor reliably demonstrate the lesion. Cystoscopic study reveals chronic cystitis. A pyelogram of the kidney, if the kidney is adequately filled, will demonstrate the fistulous tract, and the media should flow into the colon after occasionally filling a perinephric abscess cavity. Typically, the affected kidney pelvis cannot be distended to the point of pain because the injected media will escape into the colon. A barium enema is unnecessary for diagnosis and usually of little help. Riaboff and Feldman demonstrated the fistula by means of a barium enema in one case.

The curative treatment of renocolic fistula is nephrectomy with ligation of the fistulous tract as near to the colon as possible. In aged, debilitated or very ill patients this may not be feasible. Ratliff and Barnes report an operative mortality of 33 per cent in cases reported to 1939. A perinephritic abscess may be drained primarily and later a nephrectomy and ligation of the fistula done. An occasional patient will withstand only nephrostomy. Some die without benefit of operation. In some cases colonic cutaneous fistulae occur postoperatively. However, this lesion is so severe in effect upon the patient's health that considerable operative risk is warranted.

CASE REPORT

A 56-year-old white male consulted his physician because of pain in the left renal area, dysuria and cloudy urine for over three months. In 1938 the patient had been operated upon for removal of a left renal calculus following several disabling attacks of colic, but he had been told by the surgeon that the stone had not been removed. The patient was positive that there had been no diagnosis of perirenal abscess preoperatively, and questioning elicited no recital of symptoms at that time which might have indicated the presence of the lesion. Convalescence from the operation was slow, with urinary drainage from the wound for eight weeks. After recovering, the patient resumed work as a rancher and was free of symptoms for five years.

Two or three years before the present illness, aching developed in the left flank and recurred periodically. However, there were no urinary symptoms. Three months before he was examined by the author, the patient had had what he termed "flu" which began as an upper respiratory infection and then "settled in my bowels." There was left upper abdominal pain and aching and tenderness for about two weeks, followed by loose stools and disappearance of these symptoms. Blood was not observed in the stools at this time, although it was not searched for.

Weak, emaciated, discouraged, chronically ill when he came under the author's observation, the patient was hospitalized without delay. General examination disclosed nothing of note. The abdomen was thin and no masses were

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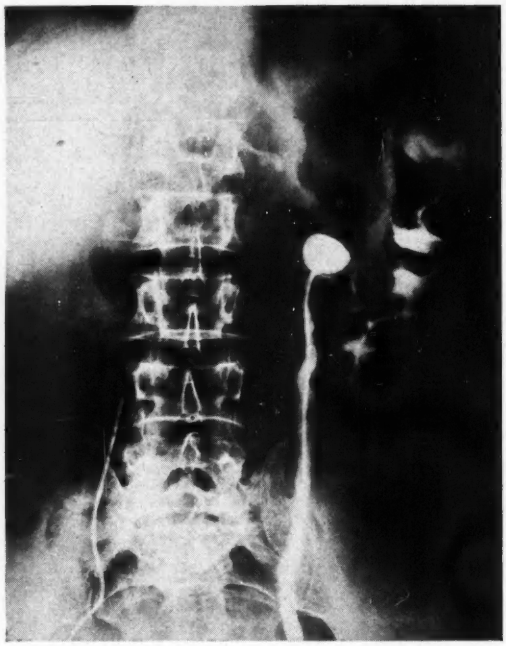

After rapid injection of 50 cc. sodium iodide solution, the tiny pelvis surrounding the left renal calculus, the fistulous tracts, and partial filling of the descending colon were demonstrated. This film established the diagnosis.

found, although there was some tenderness over the anterior end of the well-healed left lumbar scar. External genitalia were normal and the prostate normal in size and texture for his age. A voided specimen of urine was cloudy, and over 1.0 cm. of pus settled in the bottom of the centrifuge tube. Results of urinalysis were otherwise normal. Erythrocytes numbered 4.6 million with a hemoglobin value of 86 per cent and leukocytes numbered 6,100. The nonprotein nitrogen level was 37.5. Results of a Kahn test were normal. Urine specimens from the left kidney and bladder contained much pus and B. coli on culture, whereas urine from the right kidney contained no pus and no growth on culture. A roentgenogram of the chest showed no abnormality of the heart or aorta. There was moderate generalized emphysema.

A cystoscopic study showed no intrusion by the prostate, but generalized subacute cystitis was noted. Urine came from the right ureteral orifice in spurts, but none was seen coming from the left orifice. A No. 6 (French) catheter was passed up each ureter easily and a normal flow of clear urine was obtained from the right kidney, but only a small amount of thick pus could be aspirated from the left. Roentgen studies, including pyelograms, were made and a few calcific flecks were noted in the parenchyma of the right kidney, which was otherwise normal. At the upper end of the left ureteral catheter was a round, laminated calculus 2.5 cm. in diameter, apparently in the left kidney pelvis. When a small amount of 12½ per cent sodium iodide solution was injected into the pelvis through the catheter, a tiny pelvis closely surrounding the calculus was demonstrated with a satisfactory filling of the ureter. When larger amounts of the solution were injected, the three sinus tracts leading downward and lateralward from the kidney pelvis were filled and eventually the descending colon was partially filled. As the right kidney was found to be functionally good although probably containing early calculi, operation was decided upon to close the fistula and eliminate the serious urinary tract infection.

Left nephrectomy was done with the patient under pentothal and gas-oxygen anesthesia. The left lumbar scar of the previous operation was excised and the left lumbar muscles incised. As the normal perirenal fat had been replaced by dense scar tissue, dissection was extremely difficult. Although the left renal calculus was felt, no surrounding tissue suggestive of a kidney was palpated. With the field properly exposed, sharp dissection was used and a small amount of fibrotic, fat-surrounded tissue enclosing the calculus was freed with an adjacent 12 cm. of ureter. The fibrotic band, thought to be the fistulous tract, was then carefully followed downward and medialward through a mass of fat until the wall of the colon was exposed. This band was doubly ligated with a No. 00 chromic tie. Within the renal pedicle was a minute artery which was ligated and divided. Then the ureter was similarly treated and the mass removed. The wound was closed in layers with a drain after 4 gm. of sulfanilamide powder had been dusted into it. Time for the procedure was 45 minutes, and the patient was taken from the operating room in good condition.

Convalescence was stormy. The patient reacted poorly and slowly from anesthesia, showing profound narcosis and marked hypotension. A transfusion of whole blood was given, whereupon the temperature rose to 107° F., although a recheck of the donor's and the patient's blood revealed no incompatibility. After three plasma transfusions and other supportive measures in the first 48 postoperative hours, progress, although slow, was satisfactory and the patient was out of bed in seven days. Weakness and anorexia continued, but there were no specific complaints. On the ninth day following operation, a severe left corneal ulcer, which was refractory to treatment, developed. Penicillin was given for ten days postoperatively and the operative wound healed satisfactorily. When the patient left the hospital 17 days after operation there was a small amount of serous wound drainage. Few pus cells were found in an examination of the urine at that time.

The pathologist reported that the mass of fat and fibrotic tissue removed weighed 55 gm. without the stone which measured 2.7 x 1.7 cm. The only tissue which could possibly be identified microscopically as kidney consisted of a few areas of dilated renal tubules and renal pelvis epithelium. The rest of the areas showed only fat, chronic inflammatory tissue, and fibrosis.

The patient made a slow but progressive recovery. A small amount of clear serum continued to drain from the wound for four months before healing was complete. At no time did the draining serum look or smell like urine or fecal material. The urine remained clear except for an occasional leukocyte. When last seen, six months after operation, the patient was doing light ranch work and the wound had healed. There were still a few leukocytes in the urine.

COMMENT

In reviewing this case, doubt arises as to when the renocolic fistula developed. It may have developed soon after the initial operation, or it may have occurred when pain in the left loin was noted five years later. However, it would seem most likely that it developed during the bout of so-called "flu," some three months prior to the second operation, for not until then had the patient had severe pain and tenderness in the left renal area, suggesting an abscess, and it was not until then that urinary symptoms were noted.

CONCLUSIONS

Renocolic fistula is not a commonly reported lesion. Once suspected, diagnosis of it can be certainly established by

retrograde pyelogram. The treatment of choice is nephrectomy with ligation of the fistulous tract.

A case is reported in which recovery followed operation.

1515 State Street.

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Meningovascular Myelitis in Early Syphilis

ERNEST K. STRATTON, M.D., *San Francisco*

ACUTE myelitis of syphilitic origin is a rare condition in the United States if the available case reports are a true indication of its frequency. For it to occur within six months following the primary infection, however, is still more unusual.[2, 3, 6] Many of the cases of acute myelitis reported during this period have been due either to the Jarisch-Herxheimer reaction following the first injections of arsphenamine or to a hemorrhagic myelitis from arsenical intoxication.[1, 4, 7]

When this tragic involvement occurs during therapy a differential diagnosis between these three possible causes is in many instances a difficult one to make. The neurological signs and symptoms of cord damage resulting from any one of them are more or less the same, regardless of the precipitating cause. If the patient recovers, credit is usually given to the method used in handling of the case and an etiological diagnosis is established on that basis. For the patient who dies, only examination of a cord section absolutely ascertains which process is the responsible one.

The following case report illustrates the problem involved under such circumstances:

CASE REPORT

The patient, a white female, was examined March 8, 1943. The skin on the entire body was covered with maculopapular eruptions of secondary syphilis and there were mucous patches in the mouth, as well as generalized lymphadenopathy. The patient complained of dull bifrontal headache. Results of blood tests by both the Kolmer and Kahn methods were four plus. Neoarsphenamine, 0.9 gm. intravenously, was given every fifth day for eight doses. Following the eighth injection, generalized arsenical dermatitis appeared. The patient was very ill, the skin of the entire body, including hair and nails, exfoliated, and there was a decrease in body weight of 40 pounds to a total of 115. After eight weeks during which vitamin therapy was the only medication, the patient began to improve and regained 20 pounds. A blood test on June 25 showed that the Kolmer reaction had been reduced to negative and the Kahn to three plus.

Around the first of September, however, the patient began complaining of intermittent deep aching of both lower extremities from the knees down, mostly when sitting. It was present day and night. Also, she complained of a progressive weakness of the knees and a fear of falling. There was incoordination of the legs in walking and she began staggering. The incoordination was worse on descending stairs but present also in ascending. There was "numbness" from the hips down, with decreased perception of touch and temperature. The patient was unable to void except with considerable effort and straining. Marked constipation was present.

A spinal fluid examination made at this time showed 83 cells per cu. mm.; a positive globulin; total protein was 0.107 mg. per 100 cc.; colloidal gold 1113331110, and Kolmer reaction two plus.

The patient had received no antiluetic treatment of any kind since April 20, the date the arsenical toxic skin symptoms first appeared, but in view of the positive luetic findings in the spinal fluid as well as the signs of progressive cord damage, specific treatment was again begun, this time starting with bismuth subsalicylate intramuscularly (0.13 gm.). After two months of bismuth therapy, no improvement was observed, so on November 11 1 gm. of tryparsamide was given intravenously. Nausea followed this injection but no skin reaction. Two grams more of tryparsamide was given on each of the following dates: November 18 and 26 and December 2. Neurological symptoms became more pronounced. The patient complained almost constantly of the sensation of a tight band or girdle squeezing the abdomen. The legs became progressively weaker, the patient fell to the floor and was too weak to arise without assistance.

Physical examination: The general physical examination revealed nothing unusual. The blood pressure, blood count and urinalysis were essentially normal.

*Neurological examination** revealed an uncertain gait, positive Romberg, moderate general wasting of the muscles and marked ataxia. Sensation to touch about the nose was diminished; that from T 10 was variable, with saddle anesthesia. Vibratory sensation was absent below the knees. Reflexes in the upper extremities were exaggerated bilaterally as were the patellar jerks, but the ankle jerks were absent. Plantar responses were equivocal. Examination of the cranial nerves gave essentially normal results.

More tryparsamide was given, followed by a gain in weight and general improvement. However, the bladder, bowel and leg paralysis became more complete. After eight weeks, cystitis, pyelitis and pyelonephritis developed rapidly, and death resulted from streptococcal septicemia and bronchopneumonia in February, 1944. A spinal fluid examination made a few days before death showed the Kolmer to be negative in all dilutions, and the Kahn two plus, the cell count 74 and the colloidal gold 0012332100.

Microscopic findings* in the spinal cord were reported as

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*The neurological examination and report and the pathological examination and report were made, respectively, by Dr. Helen Starbuck, San Francisco, and Dr. Melvin Friedman, University of California Medical School, San Francisco.

follows: Chronic leptomeningitis—fibrous thickening of pia mater and moderate lymphocytic infiltration.

Partial loss of nerve fibers in both dorsal and lateral funiculi, most pronounced in the dorsal columns in the cervical region and lateral pyramidal tracts in the lower thoracic region, suggesting a diffuse parenchymatous destruction within the cord.

Arteritis, syphilitic type, of the larger arteries.

Degeneration of a small percentage of nerve cells in inflamed areas, particularly the anterior horn cells.

Thick collars of lymphocytes around many small blood vessels in gray and white matter.

Intense hyperemia of tiny blood vessels in some inflamed areas.

Few small hemorrhages in gray matter, often but not always near a small blood vessel.

Absence of ring hemorrhages, perivascular necrosis, hydropic or fatty degeneration of endothelial cells, and diffuse uniform neuronal disease.

With the exception of the few small hemorrhages the evidence supports the diagnosis of syphilitic meningomyelitis, and this evidence is quite compatible with that diagnosis. In support of arsphenamine myelitis are the changes in the blood vessels and hemorrhages, none of which are specific or exactly typical, while against this complication is the last noted finding listing the more characteristic findings of arsenic reaction. In the opinion of the pathologist, therefore, the patient undoubtedly had syphilitic meningomyelitis as the principal lesion, and while a superimposed arsenical reaction of minor proportions cannot be entirely excluded, the evidence in its support is very feeble.

While the spinal fluid examination made at the onset of the cord symptoms indicated the presence of a definite luetic involvement of the nervous system and while the signs and symptoms of acute myelitis did not appear until nearly three months after the onset of the arsenical dermatitis, the fact that this patient had been so ill generally from the drug intoxication led to the belief that the arsenic intoxication had played a definite part in the nervous system damage. Bismuth therapy following the spinal fluid examination and later tryparsamide caused no improvement in the condition; in fact it seemed to worsen under antiluetic treatment. Also, the blood Wassermann had reversed from a 4 plus to a negative during the interval when no specific therapy was given and before the cord symptoms developed.

Altogether these observations strengthened the belief that the myelitis was of toxic origin and deterred the author from administering other specific therapy such as Swift-Ellis salvarsanized serum from a donor early in the disease when such therapy might have been of value. Also, the spinal fluid taken just before death showed a reversal of the Kolmer two negative, which again was interpreted as corroborating evidence of toxic etiology. The spinal cord sections, however, indicate that syphilis alone was responsible for the damage. Sections obtained at different levels of the cord showed the same inflammatory reaction. The meninges and vessels of the brain showed similar involvement. The microscopic diagnosis, therefore, was diffuse syphilitic meningovascular myeloencephalitis.[5, 8]

Nonne, a syphilographer of great experience, commenting on his observation of patients contracting syphilis late in life, said: "They are prone to develop early nervous system involvement and such processes in these patients are usually rapidly destructive."

SUMMARY

Acute arsenical dermatitis appeared in a patient being treated for secondary syphilis following the eighth injection of neoarsphenamine: The skin exfoliated, the patient became very ill, lost 40 pounds and for three months was hospitalized. During this period, although no further antiluetic treatment was given, the blood Wassermann became negative and the patient regained 20 pounds.

Symptoms of neuraxis involvement became manifest five months after the primary luetic infection. Spinal fluid findings were positive for syphilis, and, in spite of antiluetic therapy, paralysis ensued and the patient died of intercurrent infection.

Microscopic examination of sections of the cord showed the pathological process to be caused by syphilis and not by arsenical toxicity as was thought probable at the time of onset. This latter possibility prevented the use of more vigorous types of antiluetic therapy at a time when they might have been of value.

490 Post Street.

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CLINICAL SYMPOSIUM

Prepared under the direction of EDGAR WAYBURN, M.D., *San Francisco*, and CLARENCE J. BERNE, M.D., *Los Angeles*

Saddle Block and Caudal Block Analgesia for the Control of Pain in Labor

DR. KARL L. SCHAUPP, JR.:*

CAUDAL anesthesia for control of pain in labor was started at Stanford Hospital about 1942. A satisfactory procedure using the catheter technique was developed, and we have used it in about 6,000 cases since then. With the advent of spinal anesthesia for delivery, and its growing popularity, we decided to investigate its possibilities although we were satisfied with the caudal technique. A series was started in January 1948, using spinal and caudal anesthesia for alternate nulliparas to see if superiority for one method or the other could be established. Spinal anesthesia has been used almost routinely for ten years in doing cesarian sections.

ANATOMY

The dissociation of the motor and sensory nerves of the uterus makes it possible to use such methods as spinal and caudal block during labor without interfering with the progress of labor. The sensory impulses are carried in visceral afferent fibers of the sympathetic system through the ganglia of the eleventh and twelfth dorsal segments. The motor impulses arise somewhere above the tenth dorsal segment. Motor and sensory nerves to the cervix and the lower uterine segment course through the parasympathetic plexuses and communicate with the second, third, and fourth sacral nerves. Somatic nerves to the vaginal canal and perineum originate in the sacral plexus. Thus it may be seen that a level of anesthesia to D-11 will block the pain of uterine contractions, cervical dilation, and vaginal and perineal distention while not interfering with contractions.

The only other anatomical consideration of note is the exaggeration of lumbar lordosis in pregnant women. This modifies the distribution of hyperbaric (heavier than spinal fluid) solutions given intraspinally in the lateral position with a change to the supine position immediately following. The level of anesthesia goes higher than desired unless the patient is put in a slight reverse Trendelenburg position.

TYPES OF SPINAL ANESTHESIA

As described by Adriani, there are five kinds of spinal blocks, if divided by spinal level:

1. *Saddle*, as the name implies, is essentially perineal analgesia with no motor changes in the legs.

2. *Modified Saddle* includes some sensory changes in the legs and a weakening, but not loss, of motor power.

3. *Low Spinal* is anesthesia to about the level of the umbilicus, with partial or complete paralysis of the legs.

4 and 5 are *Medium* and *High Spinals* with which we are not concerned here.

It is easy to see, on theoretical grounds, why the saddle and modified saddle blocks would not relieve the pain of uterine contractions, but would permit a low forceps delivery with episiotomy. This is actually the case. If relief from pain is desired, low spinal anesthesia with a level at least to the umbilicus must be obtained.

Lest the patient overhear and be alarmed by the word "spinal," obstetricians usually use the term "saddle block" rather than the more exact "low spinal anesthesia." As this is sometimes confusing to an anesthetist not familiar with the usage in obstetrics, perhaps it would be better to adopt the term "obstetrical saddle block."

TYPES OF CAUDAL ANESTHESIA

DR. RAPHAEL B. DURFEE:†

The techniques of caudal anesthesia are variations of one basic type of application of the anesthetic agent to the patient via the caudal space. There are several modifications of the original technique described for the procedure, but only the more commonly used ones will be discussed. The most generally used application is that described by Hingson and Edwards, who insert a special malleable needle into the caudal canal. This needle is connected to a metycaine ampoule by means of a sterile piece of rubber tubing, and the patient is placed on her back. Not long ago all such patients were placed on their sides following administration of the anesthetic, in order to prevent undue bending of the needle, but most observers have come to the conclusion that this makes little difference. It is generally felt that the moving of a patient with the needle in place increases the danger of needle breakage or displacement. To overcome this danger, we use special pliable catheters which are much more adaptable to obstetrical use than the malleable needle. These catheters are inserted through a 15-gauge needle into the caudal space, and are then taped into position and connected to the metycaine ampoule.

*Teaching Assistant in Obstetrics and Gynecology.

†Clinical Instructor in Obstetrics and Gynecology, Stanford University.

The first use of the procedure in obstetrics was in the administration of the so-called terminal caudal procedure for anesthesia. By this is meant a single injection of the anesthetic as the end of the first stage of labor approaches, with the idea of using it as the procedure of choice during the actual delivery. Therefore, it is obvious that there is no reason for leaving an inlying trocar of any kind in the caudal canal. In the comparative studies of saddle-block and caudal anesthesia the caudal effects and results obtained with these single shot applications are the only ones truly comparable with those obtained with saddle-block. We definitely favor the use of an inlying catheter for caudal anesthesia when a long or continuous application is desired, whereas a single needle injection is more desirable for the single shot application. By either procedure, the area anesthetized is expected to be the same, although of course there will be a difference in the duration of anesthesia. The level of anesthesia will be somewhere between the umbilicus and symphysis, but while the prolonged application will afford complete relief of pain for the greater part of the first stage and all the second stage, the single application will give relief of pain in the second stage only.

PROCEDURES IN CAUDAL ANESTHESIA

When the cervix of a primipara is dilated to approximately 4 cm., or that of a multipara to 3 cm., and the patient is in good labor she is given 0.2 gm. of nembutal or seconal. Twenty minutes later she is prepared for the injection. She is placed in the prone position with the bolster directly under the hips to hold the gravid uterus off the bed as much as possible. The buttocks and sacral area are prepared with a solution such as tincture merthiolate or phemerol and the area is draped with sterile towels. The equipment is then set up, using a 200 cc. ampoule (Lilly) of 1.5 per cent metycaine in Ringer's solution. The caudal hiatus is palpated. Approximately 2.5 cc. of the solution is injected into the skin and about 2.5 cc. into the caudal canal itself. This procedure allows for painless insertion of the longer needle and also makes it much easier to be sure that the operator has inserted the needle in the proper place. The 15-gauge needle is then inserted into the caudal canal and the stylet removed.

Following this, approximately 8 cc. of solution is injected. Three minutes is allowed to pass in order that any possible untoward reaction may be noted. No injections are made at any time without trial aspiration with the attached luer in order to make sure that the needle tip does not lie within the spinal canal or a vein. If spinal fluid or blood is aspirated, the procedure should be stopped. (Fidelity in performance of this portion of the technique not only insures greater success but also immeasurably reduces the possible risk to the patient. Care at this point cannot be overemphasized.) A No. 4 catheter is then threaded through the needle to about the third mark and the needle carefully withdrawn, leaving the catheter in place. Here again, extreme care must be taken not to advance the needle while the catheter is threaded through it or to pull the catheter out of the needle, for either could shear the catheter tip off against the sharp bevelled edge of the needle tip, leaving a portion of the catheter in the patient's body. These precautionary measures are not hard to follow when one becomes used to the technique.

The catheter is then taped in place and carried around to the patient's abdomen where, by means of a No. 23 needle, it is attached to the tubing leading from the ampoule of metycaine. As this is being done the patient is carefully rolled to her back and the bolster removed. Approximately 200 cc. more of solution is injected through the catheter. The patient is placed in semi-Fowler's position. Then the level of anesthesia is determined, the patient's blood pressure is checked, the fetal heart is auscultated, and a rectal examination is done to determine the progress of dilation. At this stage the patient has had a total of 30 cc. of metycaine. If the blood pressure drops below 80 mm. of mercury systolic, it may be easily raised by an injection of 0.5 or 0.25 cc. of neosynephrine. The fetal head may be a little higher than is normal, because of the patient's position over the bolster during the administration of the injection, but this will soon correct itself.

Additional amounts of the anesthetic agent may be given easily when the pain-relieving effect of the anesthetic diminishes, and should be given at the first complaint of discomfort. Usually 20 cc. is sufficient to continue adequate relief of pain for an hour or more. The solution is injected through the catheter by means of the syringe and stop-cock attachments connected with the metycaine ampoule. It is not necessary to move the patient again except to adjust the bed so that she is supine while the injection is being given and restored to the semi-Fowler's position when it is completed. By this means the first and second stages of labor may be conducted satisfactorily for some time.

DR. SCHAUPP:

Equipment needed for spinal anesthesia in obstetrics is the same as is needed in the administration of spinal anesthesia for any purpose. In our series we have been using "heavy Nupercaine," which is 5 mg. of Nupercaine in 2 cc. of 5 per cent glucose.

Time of injection—The time should be gauged so that while relief of pain is provided for as long a time as possible during labor, adequate anesthesia remains for the delivery. It varies with the agents used for anesthesia, the parity of the patient, and the progress being made in labor. In general, it may be given to a primigravida when the cervix is a rim, and to a multipara when the cervix is dilated to 6 cm. and good progress is being made. If the anesthetist knows the probable duration of anesthesia, by estimating the duration of labor remaining he can gauge the time for injection. We have found that 2.5 to 5 mg. of Nupercaine will last two and one-half to three hours. If anesthesia wears off too soon, however, a second injection may be made. One

patient in our group received three injections before the child was delivered.

Analgesia during the first stage of labor, before the spinal injection is given, is obtained in the usual case with Demerol 100 mg. hypodermically once or twice, and Nembutal 0.2 gm.

Achieving a Level—All the lumbar interspaces have been used as the site of injection. We use the fourth, since it is the one with which most anesthetists are familiar and a good level of anesthesia can be obtained.

There are many ways of achieving a level in the hands of trained anesthetists, but the obstetrician is interested in a standardized, simple procedure which will produce the desired result. The one currently popular is to use solutions of anesthetic agents heavier than spinal fluid (hyperbaric) in the sitting position, and to give the injection rapidly in 2 to 3 seconds. The patient is held upright by an assistant for 30 seconds. She is then laid flat with her head up on a pillow to prevent the solution from reaching vital centers in the medulla if by chance it should go up. A common error is to give the injection too slowly, with the result that the solution is pooled low in the spinal canal. This gives a true saddle block, but will not relieve labor pains. The injection should not be given during a uterine contraction, as currents set up in the spinal fluid by the contraction carry the anesthetic to a dangerously high level. Too rapid injection, too much solution, and the Trendelenburg position all may give high levels. When the procedure is properly done, the level of anesthesia reaches the umbilicus and the pain of uterine contractions is relieved completely. Motor power may or may not be present in the legs; the sphincter ani is relaxed. The relaxation and relief from pain seem to affect the cervix by allowing it to dilate more rapidly and thereby shorten labor.

Drugs Used—Varying amounts of many drugs have been reported by different authors. Following are some common doses: Procaine 50 mg. (crystals) in 2 cc. of spinal fluid. Metycaine 22.5 mg. (1.5 cc. of 1.5 per cent Metycaine used in caudal injections). Pontocaine 5 mg. (mix 2 cc. of 10 per cent glucose with 2 cc. of 1 per cent Pontocaine solution. Discard all but 1 cc.) Nupercaine 2.5 to 5 mg. (1 or 2 cc. of solution which comes already mixed with 5 per cent glucose.)

Mixtures of drugs with adrenalin or ephedrine are now being used successfully to prolong anesthesia, but we have had no experience with this in the obstetrical department.

DELIVERY

In the usual case, delivery is accomplished with forceps. They are used to lift the head over the perineum since the bearing-down reflex is abolished by the spinal or caudal, and the head rests there until the block wears off. Occasionally, delivery can be accomplished spontaneously over a relaxed perineum or with a deep episiotomy, but the patient must bear down voluntarily or fundal pressure must be used. Rarely, with exceptional uterine contractions, the baby may be delivered with no other assistance. If the patient is in bed, and alone in a room, she may not know what is occurring, and the baby can be lost. For this reason, patients in whom dilation is complete should be checked frequently.

The incidence of the need for rotation of the baby is higher than in ordinary deliveries, but the rotation is easily accomplished owing to the relaxation of the soft parts of the perineum and the levator ani muscles. This relaxation, incidentally, may explain the failure of spontaneous rotation in many cases. If a second stage of one hour is allowed, usually the head will rotate and descend to the perineum. Breech delivery may be accomplished with the patient under spinal or caudal block alone, but if intra-uterine manipulations are required a deep anesthesia by ether may be necessary to relax the uterus. Podalic version of the infant should probably not be attempted with either saddle or caudal block alone.

Episiotomies are done routinely on all primigravidas, and on all multiparas who need it. The infants usually cry as soon as the head clears the perineum, and as there is no interference with uterine contractions, blood loss is minimal.

DR. DURFEE:

Obstetrical Advantages—The advantages of obstetrical anesthesia of this type are numerous:

1. Complete relief of pain throughout the first and second stages of labor.
2. Absence of need for additional anesthesia.
3. Shortening of the first stage of labor.
4. Exercise of control in operative obstetrics.
5. Facilitation of all operative obstetrical procedures.
6. Provision of a previously established anesthesia for most obstetrical emergencies and any procedures that may arise for taking care of them, including cesarean sections.
7. Delivery without the influence of narcotic drugs or inhalation anesthesia. (For this reason it is especially recommended for delivery of premature infants.)
8. Less loss of blood.
9. Prevention of excessive tension against the cord in a situation where the cord is short or foreshortened by malplacement around the fetal head.
10. Prevention of birth trauma to maternal tissues by allowing for complete relaxation of the tissues of the birth canal.
11. Reduction of the incidence of precipitate deliveries.
12. The patient is happy, awake, and in excellent physical condition.
13. Preservation of uterine tone and prevention of third stage uterine atony.
14. Ease of early artificial rupture of membranes.
15. Use in patients in heart disease, general debility, pulmonary diseases, upper respiratory infection and toxemia of pregnancy.

16. Improved morale of patient, staff, and relatives.

17. Ease in diagnosis of dilation and of the position of the fetal head.

18. Allowance for prolonged second stage without undue effect on baby or mother.

19. Shortening of postpartum convalescence.

SPINAL ANESTHESIA IN CESAREAN SECTIONS

DR. SCHAUPP:

Spinal anesthesia has been used for cesarean sections at Stanford University Hospital for many years with most satisfactory results. The injection usually is given with the patient in the lateral, slightly reverse Trendelenburg position to prevent too high a level. Many drugs have been used, but at present the anesthesia department usually uses Pontocaine in doses of from 5 to 15 mg. weighted with 10 per cent glucose, the variation depending upon the views of the individual anesthetist. Ephedrine 50 mg. hypodermically is given routinely.

CAUDAL ANESTHESIA IN CESAREAN SECTIONS

DR. DURFEE:

We have used the caudal technique for cesarean sections, but not as often as spinal anesthesia nor with as great over-all success. In most instances the caudal was started for what appeared to be normal labor. Some patients required accessory anesthesia because of incomplete relief of pain, but in many cases nothing additional was needed but oxygen for the child. In giving a caudal anesthetic for cesarean section the best method is to give it 30 to 45 minutes before operation to insure a proper level of anesthesia. This often requires 10 to 15 cc. more as a total dose than is needed for normal delivery. If the operative procedure should be prolonged, the advantage of continuous application is obvious. On the whole, for routine elective cesarean sections spinal anesthesia is preferable to caudal because of simplicity of technique.

COMPLICATIONS AND CONTRAINDICATIONS

DRS. SCHAUPP AND DURFEE:

The most important added consideration in both spinal and caudal anesthesia is the presence of the fetus, which is susceptible to prolonged hypotension and to anoxemia. A systolic blood pressure of 80 mm. of mercury in the mother is considered necessary to prevent fetal distress, as it takes this much pressure to maintain adequate circulation for the placenta. Consequently, a careful, regular check on the mother's blood pressure is necessary following the injection. Treatment for hypotension consists of the administration of Neosynephrine 2 mg. hypodermically, or ephedrine 25 to 50 mg. hypodermically. Elevation of the legs to put pooled blood back into the circulation is resorted to in extreme cases or emergencies, with care taken not to raise the level of anesthesia above that normally allowed by spinal injection. In our series the incidence of hypotension requiring treatment was 17.3 per cent in the cases in which spinal anesthesia was used, and 12.9 per cent in the patients given caudal anesthesia.

The level of anesthesia must be checked, as a high level will paralyze the muscles of respiration and may cause anoxemia. As the fetus may be affected by anoxemia in the mother, permanent damage to the baby can result. The fetal heart reflects such changes by changes in pulse rate, usually a slowing. Pulse rates of 80 to 90 per minute are not unusual. The same phenomenon is observed in the case of hypotension. Response to adequate oxygenation or raising the blood pressure of the mother is usually prompt. Deep breathing, pure oxygen, and artificial respiration are used — in that order — when necessary.

In giving an anesthetic by the caudal route, care must be taken against massive intravenous injections. As a precautionary measure, aspiration should be done before the solution is injected. If spinal fluid appears, it is best to abandon the procedure. If blood is aspirated readjustment of the needle usually will correct the situation and permit going ahead with the procedure.

Headaches in the postpartum period usually occur in 8 to 10 per cent of the patients given spinal anesthesia. The incidence in our series has been 8.68 per cent. Headache usually appears on the second or third day and is not very severe, lasting only 24 to 48 hours. Treatment varies greatly, no one remedy being entirely satisfactory.

Bladder dysfunction (residual urine and inability to void) may occur in postpartum patients who have received neither spinal nor caudal anesthesia, but the incidence is higher when these methods are used. In our series, it was 0.86 per cent in patients who had had caudal, and 6.5 per cent in those who had had spinal anesthesia. Recently the incidence of bladder dysfunction has been lower as a consequence of improved technique. In none of the cases was the hospital stay prolonged because of this complication. Treatment consisted of catheterization as necessary or continuous drainage through an inlying catheter and chemotherapy given prophylactically.

Neuropathy may occur following spinal anesthesia, and since the damage may be in the central nervous system, it may be permanent. Damage to the nervous system that may be caused by giving a caudal anesthesia, on the other hand, will affect only peripheral nerves and will usually clear up.

Contraindications to the giving of either caudal or spinal anesthesia include diseases of the nervous system, sepsis, spinal arthritis, skin infection near the site of puncture, shock, long-standing headache (this applies to spinal anesthesia only), and idiosyncrasy to the drugs used. Patients with hypertension must be watched with extra care as the fall in blood pressure may be excessive, and the response to pressor drugs more rapid and extreme than desired. A pilonidal cyst, whether it has been operated upon or not, is considered an absolute contraindication to caudal anesthesia. The prospect of long,

difficult labor should make one not too familiar with these procedures hesitate to use them except for the delivery itself. Given too soon, particularly if labor is desultory, either caudal or spinal anesthesia can inhibit labor.

COMMENT

For the average practitioner, anesthesia by spinal injection is the procedure of choice. He is familiar with it, as is the staff of his hospital. Relatively little study and practice are required to apply it in obstetrics. The patient is awake at the time of delivery and the infant is not under the effect of the anesthetic agent. Patients appreciate being awake to hear and see their offspring immediately.

For the patient, caudal anesthesia is the procedure of choice. It can be maintained for about 12 hours and therefore can be given earlier in labor. This decreases the amount of other medication necessary in the first stage of labor. The procedure does not cause headache. If neuropathy should occur, the chance of recovery is excellent since the anesthetic agent is applied only to the peripheral nerves. The advantages in delivery are the same as for spinal anesthesia.

Finally, it must be remembered that, in either procedure, someone familiar with the procedure, with the complications that may result, and with the treatment of them must be in constant attendance after the anesthetic agent is injected.

California Cancer Commission Studies*

Chapter X

Skin Cancer

HENRY J. ULLMANN, M.D., *Santa Barbara*

IN 1943 the number of deaths reported from cancer of the skin was 3,273 in the registration area of the United States—a shocking figure in view of the fact that cancer of the skin is highly curable when treated properly in a reasonably early stage. Some of these deaths could have been prevented by the proper care of precancerous lesions, thus preventing the development of cancer, others by prompt diagnosis and the institution of proper treatment. Physicians must recognize that there are a number of conditions of the skin in which cancer is more likely to develop than it is upon normal skin, and they must suspect cancer when anything unusual develops. These conditions have been called "precancerous dermatoses."

The following are some of the skin lesions or conditions in which cancer is likely to develop eventually:

Farmers' or sailors' skin is found on the exposed areas of skin. It is found only in adults and more commonly in later life among those who have had years of exposure to sun and wind. Persons with red or sandy complexion and those with skin that burns easily and does not tan or is excessively dry are especially prone to the disease. The skin is dry and frequently parchment-like with white sclerotic areas. In some instances the appearance closely simulates that of chronic radiation dermatitis. Keratoses are common, and sooner or later epitheliomas develop in some of these keratoses, or independently on other areas. Multiple epitheliomas are not uncommon, but fortunately many are of a low grade malignancy and grow slowly. There is degeneration and atrophy of greater or lesser degree in the upper layers of the skin, and the epidermis shows atrophy except where keratoses are developing.

Treatment consists in protection against sun and wind and the use of oily creams. Mineral oils may serve as protection, but are of very little use in actually softening the skin. Animal oils and waxes (neatsfoot oil, lard, lanolin) are the most penetrating and effective, especially when incorporated in a cream containing a wetting agent. The next most effective are the vegetable oils, especially olive oil. A very effective treatment, in addition to the oily creams, is the use of massive doses of Vitamin A—200,000 to 300,000 units a day. Immediate improvement must not be expected, but a definite change for the better will be noticed in six to eight weeks. Then the dose may be reduced gradually over months, until a dose of 50,000 to 100,000 units is reached, and this continued for several years or until the physician decides no further improvement can be expected. The daily dose may then be reduced to 25,000 units and continued indefinitely, except in those cases in which the skin shows signs of recurring deterioration. In that event the dose must be increased to a point where the skin again shows improvement. Keratoses and epitheliomas must be treated promptly as they appear, but radiation in the treatment of lesions on skin of this type must be used with great caution, if at all.

Keratoses are the most common lesions preceding cancer of the skin. Senile keratoses are most frequent on the exposed surfaces and most common in the older age groups, although they are occasionally found in the 30-40 age group. They are rarely seen in Amerinds, Arabs, or Negroes. They usually appear on skin showing signs of senile degeneration and vary in size from a millimeter to several centimeters. Often multiple, they may be, in the early stage, only a thickened, firmly adherent, horny scale, varying in color from greyish through brown and yellow to reddish. Scales are frequently shed only to reappear, and the patient will often say that it has "cleared up" repeatedly and recurred due to this scale shedding. Not infrequently, a warty hyperkeratosis will form, and such lesions are often called warts by the patient. This growth may indicate a carcinomatous change, but in many instances the change to cancer is so insidious that it infiltrates widely before extending above the skin level.

Keratoses are the most dangerous, common and typical of the true precanceroses. The slightest suspicion of malignant change calls for biopsy before planning treatment. They are particularly dangerous when they develop on the mucous surface of the lips or at a mucocutaneous junction. Basal, squamous or mixed basal and squamous cell cancer may develop.

The treatment is largely a question of good judgment. As they so relatively frequently develop into cancer, it might be wise to destroy all such lesions in patients in the lower age brackets. In old persons with multiple lesions, it is probably better practice

*Organized by the Editorial Committee of the California Cancer Commission.

Note by Editorial Committee: Dr. Ullmann was requested to write this chapter because of his extensive experience in radiological treatment of skin cancer. A committee of dermatologists, consisting of Dr. H. J. Templeton, Dr. Samuel Ayres and Dr. Nelson Anderson, has been preparing an illustrated article on "Skin Neoplasms" for the California Cancer Commission Studies.

to keep them under close observation and treat only those lesions that show active growth or a suspicion of developing cancer. For these lesions, such a course is usually safe because of the usual slow development and growth of cancers of this kind. However, the entire group should be treated medically as outlined before.

Thorough desiccation is a satisfactory treatment for the majority of such lesions, although it leaves a scar. Freezing, trichloracetic acid or phenol may be used for very superficial lesions, but if they recur they should be desiccated rather than refrozen. Radiation, either x-ray or radium, has been recommended, but this is dangerous unless biopsy has shown the absence of cancer. The dose required to removed a moderately thick keratosis is an appreciable fraction of that required for treatment of cancer, and tissue once irradiated to that degree may not tolerate the further dose required if cancer should appear in the area later. A good rule to follow is: *If there is any suspicion or presumptive evidence of cancer, the lesion should be treated as a cancer unless a biopsy has been taken and the lesion proven benign.* Any of these lesions may be excised and the tissue removed submitted to a pathologist. None of these lesions occurring on mucous membranes or at mucocutaneous junctions should be watched for developments. They should be destroyed at once.

Seborrheic keratoses are potentially less dangerous than the senile varieties. They show great variation in size (a millimeter or less to several centimeters) and are sharply circumscribed. The thickness varies from a slight elevation above the surrounding skin to several millimeters. They are firm and rubbery rather than hard. The surface varies from smooth to verrucous, and the color from a dark or brownish yellow to a brownish black. Some, especially on blondes, may be yellower or greyer than the surrounding skin. Many have a distinctly greasy appearance. They are most common on the trunk, and some individuals may be literally peppered with them. While occasionally seen on the young, they are more common on the elderly, but not at all uncommon in persons of middle-age with fair skin who spend hours sun bathing. Single lesions are frequently seen. They may simulate some form of non-hairy pigmented nevi—the nevoid keratoses.

True seborrheic keratoses need not be destroyed except for cosmetic reasons, but should be examined periodically for signs of malignant change.

Desiccation is the most commonly used method of removal, although excision is frequently done. X-rays or radium should not be used. Freezing is satisfactory for thin lesions, but the treatment may have to be repeated.

Arsenical keratoses will follow the use of arsenic in susceptible individuals, no matter how it is given, even in small doses over a long period of time. They are most common on the palms and soles, but may be generalized and accompanied by wide pigmentation over the trunk. Excessive dryness of the palms and soles, with miliary or larger, deep-seated keratoses peppered over them is typical. Occasionally the lesions may be large and thick. These larger ones are very apt to become malignant eventually and require the treatment given for other skin cancer. However, many years after exposure to arsenic usually elapse before actual cancer appears. If large, these lesions should be treated as senile keratoses. Lanolin or similar ointments should be applied frequently to the smaller lesions and the surrounding skin.

Industrial keratoses, found at times on patients handling certain tars and dyes, should be treated as are arsenical keratoses, for they, like the arsenical keratoses, are more likely to develop malignant change than are the common senile form.

Leukoplakia is listed here only because it occasionally occurs on the penis, labia minora and labia majora. It is most common on the lips, tongue and buccal mucous membrane, and therefore treatment of it will be discussed in the section on lips, mouth and tongue.

Chronic radiation dermatitis is one of the most distressing conditions with which a physician has to deal. It resembles an aggravated form of senile or sailor's skin as well as xeroderma pigmentosum. It is, unfortunately, of somewhat common occurrence and may not appear until years after the irradiation injury. The eventual development of squamous cell cancer in the affected area is all too common. Many of the pioneer workers with x-ray have died from cancer developing in these areas. The best treatment, when feasible, in aggravated cases is excision of the area, followed by plastic repair. The milder or earlier cases may be treated with aloes vera or radon ointments. In no instance, with the exception of radon ointment, should any form of irradiation be used in the treatment; occasional use of ultraviolet radiation in treatment is a pernicious practice. Individual keratoses may be removed by thorough desiccation as they appear. Local applications must be bland and soothing, such as neatsfoot oil, lanolin, zinc oxide or boric ointment. Ointments containing essential oils which are stimulating as well as antipruritic, such as calmitol, must *not* be used. Where there is only atrophy of the skin, dryness and telangiectasia, no treatment is required, but frequent careful inspection must be made for keratoses and developing cancer. The patient should be told to avoid overexposure to sunlight and ultraviolet treatments on involved areas, and to avoid any but bland, oily creams, if creams are desired for excessive dryness of the skin. Chronic ulcers should be excised and the site repaired.

Cutaneous horns, although usually found in the elderly, may be seen in children. When the horns are large or of long duration, *the presence of cancerous change in the base must be suspected.* Excision of these lesions is preferable. Radium and the x-ray have been used, but as the objection to them for this purpose is the same as in the case of senile

keratoses, a biopsy should be done before treatment so that an adequate dose can be given if the lesion is cancerous.

Scars: While cancers developing in scars are frequently seen, the percentage is obviously low. When cancer is found, it is usually of squamous cell structure and in scars of 20 or more years' duration. Large scars should be thoroughly examined at yearly intervals for changes that suggest a beginning cancer. Any suspicious area should be biopsied and, if cancer is found, the entire scar, when possible, should be excised and plastic repair done.

Moles and Nevi: These lesions are becoming more and more important because of the public's increasing awareness of the danger of a "black mole"; and naturally laymen do not always differentiate between a melanoma and an ordinary brown mole or an angioma. Nevi, moles or "birthmarks" occur in large numbers and great variety and, fortunately, the great majority are harmless or rarely become malignant. As there is hardly anyone who does not have at least one mole, the percentage of cancer developing in such lesions must be low. However, malignant changes do occur in them sometimes, and the lesions comprise a great variety of malignant types and degrees of malignancy.

There is hardly a physician who has not seen the highly malignant and widely metastasizing malignant melanoma that has developed in a pigmented mole, even the smallest, either spontaneously or from improper treatment, irritation or trauma. And yet the relatively benign basal cell cancer may also develop in a mole, and a sarcoma has been reported developing from a verrucous nevus. It must be remembered that a *malignant melanoma may develop from a non-pigmented lesion, as well as a pigmented one, so the absence of pigment is not an indication that the lesion may never become malignant.* A lesion need not be clinically evident at birth to be a mole, with or without nevus cells. Only by pathologic examination can a lesion be identified as a true nevus—that is, containing nevus cells. The presence or absence of these cells does not affect the potential danger of future malignancy.

The common mole, from a few millimeters to a centimeter in size, is not usually dangerous unless subjected to repeated irritation, trauma or improper treatment over a considerable period, usually years. Large lesions, brown or brownish black or chocolate colored, with or without hair, seldom become malignant, although malignancy does occasionally develop, especially in moles subject to irritation. The author observed one case in which malignant melanoma developed from a mole when the patient reached the age of 20, without a history of trauma or irritation. When malignancy develops in moles or nevi, it is generally at or after adolescence. For that reason it would seem wise to remove all such lesions, by *wide excision down to the underlying fascia,* whenever this is possible, before adolescence. This is especially necessary where the lesion is at a site subject to trauma, such as hands, feet, belt-line and collar line.

The most dangerous lesion is the so called "blue-black" mole. It may occur anywhere on the body and be overlooked when it occurs between the toes, under a nail or behind an ear. It varies in size from a millimeter to nearly a centimeter, and it may be flat and level with the skin or considerably raised. The surface is smooth and, not infrequently, shiny. In some of the larger ones the surface appearance is that of a juicy or pulpy material under a somewhat translucent pellicle. The author considers this appearance presumptive evidence of malignant change although he has removed one such lesion that was reported non-malignant. All others removed, however, were reported as highly malignant. *Improper treatment, that is, anything short of wide excision to fascia, will often cause these blue-black lesions to explode into cancer.* While some grow actively as cancer for a time without metastases, metastasis is generally widespread before malignant change is recognized in the primary lesion, and the first indication of such change is the discovery of metastasis in a regional lymph node.

While it is true that an experienced dermatologist can usually differentiate between small common moles that may be desiccated with safety, and dangerous or potentially dangerous lesions, it cannot be said in general that the treatment of moles by desiccation is an entirely safe procedure. Many lesions have exploded into highly malignant metastasizing cancer following such treatment of what was considered a harmless blemish.

Surgical excision with adequate margin is always safe, and the only method that can be recommended as a general procedure.

Neither x-ray nor radium should be used in the treatment of moles.

Chronic ulcers that have existed for a long period without any tendency to heal must be watched for the first suspicious sign suggesting cancer, as squamous cell cancer has been reported in deep burns, decubitus ulcers and varicose ulcers, ulcers in pellagra, and traumatic ulcers in legs where there was poor circulation and scleroderma. This also applies to chronic fistulas.

Biopsy should be done at the first suspicious change in the appearance of a chronic ulcer or sinus, and if cancer is found, appropriate operation is indicated.

Kraurosis vulvae is usually found in elderly women or at the menopause, but it has been observed in younger women following surgical castration. The first evidence of the disease is usually the appearance of small, reddish areas near the ostium vaginae, frequently with severe itching. These spots become depressed and sensitive to touch and later there is narrowing of the ostium due to loss of tissue elasticity. The natural folds become obliterated and the surface thin, somewhat translucent and glossy, dry or moist. With further progress of the disease, either symmetrically or irregularly, both labiae may be practically obliterated and thin; they may be somewhat translucent or may change

to thick and opaque. The color varies from white to pearly, reddish pink to bluish. Leukoplakia is not uncommon. Squamous cell cancer may follow, especially where leukoplakia is present, so that the lesions should be examined regularly at least every six months.

Mild antipruritics may be used to alleviate the itching when present. Amniotin suppositories have been found of considerable value in some cases. X-ray, in small doses, has been used to relieve the itching, but must be used with judgment and strictly limited. Radium has been reported successful in the treatment of small areas of leukoplakia. When ulcers, erosions, vegetations, warty keratoses and nodules occur, they should be excised and small areas thoroughly desiccated. Otherwise, treatment should be conservative. Vulvectomy, followed by plastic repair, may be necessary where there are large areas of leukoplakia, erosion or ulceration or the signs of beginning cancer. The primary duty of the physician is to keep the patient under careful supervision so as to be able to act promptly at the first suspicion of malignant change.

SKIN CANCER

The most common cancers of the skin seen in everyday practice are the basal cell, squamous cell (epidermoid) and the mixed basal and squamous cell growths. They are all classified under the name "epithelioma" and the term epithelioma denotes a malignant lesion. Although an experienced observer may make a good guess as to whether a specific lesion is a basal or squamous cell cancer, biopsy may reveal that what was though to be a typical basal cell cancer was a highly malignant squamous cell cancer. On chance and probability, a guess that a lesion on a nose is a basal cell and one on an ear is a squamous cell will give a high percentage of correct diagnoses for the simple reason that these lesions are more common at these locations. Nevertheless, biopsy of epitheliomas is important to determine the diagnosis, treatment and prognosis.

Many epitheliomas of the skin have been named after the "exciting" cause—sun or actinic cancer, chimney-sweeps' cancer, kangri cancer, occupational cancer—but as discussion of these varied cancers belongs in a monograph or textbook, only the points that are pertinent to the objects of this presentation will be taken up.

The development of epitheliomas in the precanceroses has made the proper treatment of these lesions a major factor in the prevention of cancer. It is of still greater importance to be able to recognize cancer as early as possible in order to institute the proper treatment while it is curable; and the cure rate for cancer of the skin, in a reasonably early stage, is as great as or greater than that of any other important disease that a physician is called upon to treat.

Epithelioma of the skin, while usually seen in those of advanced years, has been reported many times in adolescence and even in childhood. It is not too uncommon in young adults with fair or sandy complexion who are continuously exposed to sunlight and hot, drying winds—the so-called sun or actinic cancer. The average age, however, has been given as about 52. The disease is more common in men than in women in the ratio of about 70:30, and it is the opinion of the author that this is, at least partly, due to the fact that women, as a class, grease their faces whereas men do not. In the author's experience, most of the cases in women are among those who live on ranches where they are exposed to sun and wind and who say that they have never used creams or similar cosmetics. Cancers of the skin are rare in Negroes, and less common in persons with dark, oily skins.

Epitheliomas are most common about the head and especially the face, but are found anywhere on the body and may be single or multiple. Many, especially the basal cell cancers, grow slowly, but some may appear as suddenly and grow as rapidly as a granuloma pyogenicum, with which they may be confused. In the author's experience the history of lesions, proven by biopsy to be cancer, may be as short as six weeks to as long as 18 years. Such lesions vary greatly in appearance. An epithelioma may be a symptomless, semi-translucent nodule, a patch that simulates eczema (even to the itching), a crateriform or umbilicated keratotic lesion with a rolled, waxy margin, a flat keratosis with adherent scale that bleeds when scale is removed (a keratosis may do the same thing) or a shallow or deep ulceration. It may have the appearance of a whitish scar with small (sometimes only a millimeter) firmly adherent keratotic crust or scales with the intervening tissue suggesting advanced scleroderma. A sign highly suggestive of cancer in these lesions is a varying degree of telangiectasia. To the palpating finger, the lesion may be nodular or infiltrating. In some, relatively innocent in appearance, a distinct plaque may be felt in the skin and, under magnification, a fine waxy, rounded edge may be seen at the margin of the induration. This margin may also be seen without palpable induration.

Any lesion may show alternate periods of quiescence or even of slight regression and moderate or rapid growth. A common statement of a patient is that the spot had healed repeatedly only to recur, each time a little larger, and that this "healing" was the reason for not seeking advice earlier. The entire lesion may consist of a dark red or maroon-colored, smooth, sharply defined lesion which is commonly diagnosed as a dermatosis, frequently as psoriasis if scaling is present. If any such lesion persists and is recalcitrant to treatment, biopsy must be done to supply the diagnosis. If patchy scarring occurs, such lesions may be mistaken for those of lupus vulgaris or syphilis. Cauliflower-like fungating lesions are not uncommon, and many lesions are verrucous, simulating a senile wart or keratosis. This latter type is frequently on the hands. Any lesion may show papillary areas, or the entire lesion may be papillary. The cauliflower lesion is of this type.

A basal cell or mixed basal and squamous cell cancer may contain pigment with the color varying from brown to black, or there may be one or more miliary spots of black or chocolate. Some of these growths simulate melanoma very closely; in the author's experience, biopsy reports of two lesions, clinically the same, showed one to be "pigmented basal cell cancer," the other "malignant melanoma." *Pigmented lesions should not be biopsied but excised.*

The only safe rule to follow is to regard suspicious lesions as cancer and to take a biopsy specimen, except that in the case of moles wide excision should be done.

Cancer of the skin is highly curable if treated adequately. "Adequately" means thorough removal or destruction by excision or cautery or by irradiation (x-ray—radium). A high percentage of cures may be expected from either of these methods, and the method of choice is that which is easiest for the patient and leaves the least scarring. For example, a lesion on the face which would require extensive repair or cosmetic operation following surgical removal may be treated by irradiation with minimum scarring and expense to the patient, while a similar lesion on the arm or trunk may be excised, leaving a negligible linear scar. The treatment of all lesions by any method must include a wide margin of normal tissue both on the surface and in depth beyond the lesion.

It must always be remembered that *the object in treating any cancer of the skin is to remove or destroy all of it, without regard to the resulting scar.* Less than this is, without exception, disastrous to the patient.

LYMPH NODE METASTASES

Metastases to the regional lymph nodes are not common from malignant lesions of the skin except from melanomas and squamous cell cancers. When metastasis occurs, however, especially from melanomas, the situation is extremely serious. Basal cell cancer of the skin very rarely metastasizes, and while such metastases have been reported, these lesions are generally considered to spread by contiguity only. Squamous cell cancers of the skin will metastasize to the regional nodes, usually after a long period of time. Mixed basal and squamous cell tumors should be considered as squamous. Melanomas may metastasize long before malignancy is suspected.

The treatment of metastasis from cancer of the skin to the regional lymph nodes is essentially the same as that for treatment of metastasis from cancer of the mucous membrane—surgical removal in the operable cases after the primary lesion has been completely controlled, and irradiation (x-ray or radium) in the inoperable cases. Each case is a separate problem to be judged by consultation between the surgeon and radiation therapist. In the absence of metastasis, treatment of the nodes is ordinarily not undertaken.

Malignant melanoma, because of its highly malignant propensities, constitutes a different problem. Here it is generally felt that complete dissection of the nodes should be performed even if metastases are not thought to be present. In such cases, the primary lesion should be removed a few weeks before the node dissection on the assumption that nodes will screen out malignant emboli which might be expressed into the lymph channels at the time of the removal of the primary lesion. The nodes will thus filter these metastases and hold them before spread to the next link in the drainage chain. When the primary and secondary site are operated upon at the same time, without removal of the intervening tissue, recurrences are fairly commonly noted in the tissue between the primary and secondary locations. It is probably better that the primary lesion and involved nodes be removed in continuity wherever possible, as there may be tumor cells in the channels in the intervening tissue. Again it must be emphasized that irradiation has little, if any, effect on malignant melanoma.

SUMMARY

The prevention or removal of precancerous lesions is a method of preventing cancer of the skin.

In event of doubt as to the malignancy of a skin lesion, biopsy should be done *except* in the case of pigmented lesions, which must be excised to fascia with a good margin. Material from pigmented lesions excised may be examined microscopically for indications as to prognosis.

Irradiation is *never* to be used as a treatment for pigmented lesions.

Basal or squamous cell cancers of the skin may be treated by adequate operation or adequate irradiation with every expectation of cure if the treatment has not been delayed. Other methods are also employed with success. The cure depends upon the adequacy of treatment.

"Cancer of the Cervix Uteri" by H. F. Traut, M.D., and "Cancer of the Corpus Uteri" by H. N. Shaw, M.D., Chapters XXXII and XXXIII of the California Cancer Commission Studies, will be published in this section of the April issue of CALIFORNIA MEDICINE.

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EDITORIALS

Ten Years After

Periodically in the lives of men there comes a time for taking stock, for reviewing actions previously taken and assessing their worth. The best known example of this process in American history is the Gettysburg Address delivered by Abraham Lincoln in words which beggar description and defy emulation.

The time has now come for California doctors to take an appraising look at their own ten-year-old child, California Physicians' Service. The words may not come out as did Lincoln's but the retrospective approach is the same.

California Physicians' Service was organized by an aroused medical profession during days of depression, days when the average man didn't have the dollar which would have bought so much in the glutted marketplace. Goods and services were plentiful but the bridge between offering and selling was a tortuous affair with a narrow approach. Desire to buy and sell existed on both sides but the medium of exchange was absent. The economics of the time drove home to the physicians of the state the sociological problem which they had been studying for more than twenty years. Doubtless the presence of more time for thinking contributed to the arrival at the concept of C.P.S.

C.P.S. was formed late in 1938 and started operating early in 1939. Based on the desire of the doctors to provide a budget basis for the average wage-earning family for the purchase of medical and hospital care, the plan provided that the doctors themselves must be the underwriters. The financial risk was on the shoulders of the profession, not the public. The doctors agreed to give their services and to accept in exchange whatever funds might be available to pay them. Meanwhile, the public was guaranteed service.

Now, ten years later, the time has come to look over the results of this frankly experimental program and to reexamine the initial concept. Physically, C.P.S. has grown from nothing to a beneficiary membership of more than 700,000, and the growth continues. The physician members have reached a total of some 9,500 and the number is increasing daily. The organization has grown from a standing start to a business office of 517 employees.

Financially, C.P.S. has repaid its original loan from the California Medical Association, has met its bills and has accumulated $835,435 in its unit stabilization, or reserve, fund. It serves as trustee for more than $1,000,000 monthly in incoming and outgoing funds.

Morally, the progress is even greater. C.P.S. has served as a beacon light for other states. As the first statewide medically-operated prepayment medical care plan, it has set an example which has been widely followed as the proof of the pudding. Other states have studied the C.P.S. form of budget-basis medical care and have found it good. Many have followed its plans and policies and others have adapted them to their own peculiar needs. Today there are comparable plans operating in 42 states.

On top of that, C.P.S. has proved to the people of California that top grade medical care is available on a budget basis through voluntary enrollment. Not only through its own activities but also through the inauguration of other prepayment plans, C.P.S. has been in the forefront of the movement to acquaint the people of California with the knowledge

that the best in medical service can be had by the average man at a cost he can afford. Here is a true extension of medical care for the benefit of the people, sponsored by the doctors themselves and operated without governmental regulation or interference with either recipient or provider.

These accomplishments have not been gained without a struggle. There have been many dark days for C.P.S., days when both the beneficiary and the physician members have doubted the wisdom of the original plan. There have been moments of doubt in the minds of even the staunchest physician supporters of the program—but let it be noted that this doubt came not from the philosophy of the program but from the apparently unreceptive attitude of others. There have been threats of withdrawal from the service. There have been actuarial problems, arising out of the inability to provide the best in service at the least in cost. There have been attacks from politicians who would use the experience of C.P.S. as the foundation for inspired plans to set up a state monopoly to regulate all medical care.

These doubts, these threats, these attacks have been weathered. C.P.S. has continued to operate, to grow, to serve. Its increasing enrollments tell the story with eloquent clarity. Its roster of physician members reflects its acceptance by the profession. Admittedly C.P.S. is still a pilot plant. But, administered by physicians, it has repeatedly met changing conditions with a flexibility not to be expected of a government bureau, meanwhile keeping its eye on the original goal of public service.

A child of ten normally rates a birthday cake with ten candles. California Physicians' Service is this child and the cake and candles are here in the minds of the people of California. The first ten years have produced a sturdy, healthy, progressive child; the next ten may be expected to see a continued growth along the same line. In retrospect the progress looks awfully good; in prospect we can see everything to make us proud and to warrant the retention of the program of the founders.

The A.M.A. 12-Point Program

Kicking off its new public relations program, the American Medical Association has announced a 12-point plan for the extension and improvement of medical care for all the American people.

Announcement of this program, which will be found elsewhere in this issue, at a meeting of representatives of all state medical associations in Chicago on February 12 brought forth a cheer from the audience. Here, at last, was a concrete, progressive, positive program adopted by the national organization in furtherance of the aims of the Association and for the benefit of the American public. Critics of the A.M.A., including, unfortunately, some former prominent A.M.A. officials, hastened to decry the program as window dressing for a sinister campaign of lobbying and propaganda; officials of the state medical associations, those who will carry out the nationwide program, hailed it as a forward step in the direction of even greater public service.

Observers have remarked that the A.M.A.'s new program is not really new, that its basic elements have been part of the program of the A.M.A. and many of its constituent state associations for a number of years. However, this is the first time that all these items have been gathered together, put down in black and white and adopted as a specific platform for all of medicine to follow.

There is a lesson in all this. Medicine has been so steadfast in devoting its energies to the improvement of the science of medicine that the practice side of the picture has been fairly well obscured. Now, due to changing economic conditions and political philosophies, medicine finds itself in the position of having to stress the economic side of medicine in order to protect the scientific side. Public relations, or advertising if you will, must be brought into play in order that the American people may see the medical side of a picture which has too often been painted in glowing colors by the Ladies Bountiful of tax-supported bureaus. As the people will be the final arbiters in the question of compulsory or voluntary health insurance, in order to vote intelligently they must have available the views of the profession of medicine to weigh against the tax-supported blandishments of bureaucrats.

Medical advertising by individual practitioners is still frowned upon for ethical reasons which are well founded. Medical advertising by medicine en masse is something else again and the A.M.A. 12-point program looks like the product to be publicized. The people will be the beneficiaries.

CALIFORNIA MEDICAL ASSOCIATION

NOTICES AND REPORTS

Program of the American Medical Association for the Advancement of Medicine and Public Health

A Federal Department of Health.—Creation of a Federal Department of Health of Cabinet status with a Secretary who is a Doctor of Medicine, and the coordination and integration of all Federal health activities under this Department, except for the military activities of the medical services of the armed forces.

Medical Research.—Promotion of medical research through a National Science Foundation with grants to private institutions which have facilities and personnel sufficient to carry on qualified research.

Voluntary Insurance.—Further development and wider coverage by voluntary hospital and medical care plans to meet the costs of illness, with extension as rapidly as possible into rural areas. Aid through the states to the indigent and medically indigent by the utilization of voluntary hospital and medical care plans with local administration and local determination of needs.

Medical Care Authority with Consumer Representation.—Establishment in each state of a medical care authority to receive and administer funds with proper representation of medical and consumer interest.

New Facilities.—Encouragement of prompt development of diagnostic facilities, health centers and hospital services, locally originated, for rural and other areas in which the need can be shown and with local administration and control as provided by the National Hospital Survey and Construction Act or by suitable private agencies.

Public Health. — Establishment of local public health units and services and incorporation in health centers and local public health units of such services as communicable disease control, vital statistics, environmental sanitation, control of venereal diseases, maternal and child hygiene and public health laboratory services. Remuneration of health officials commensurate with their responsibility.

Mental Hygiene.—The development of a program of mental hygiene with aid to mental hygiene clinics in suitable areas.

Health Education.—Health education programs administered through suitable state and local health and medical agencies to inform the people of the available facilities and of their own responsibilities in health care.

Chronic Diseases and the Aged.—Provision of facilities for care and rehabilitation of the aged and those with chronic disease and various other groups not covered by existing proposals.

Veterans' Medical Care.—Integration of veterans' medical care and hospital facilities with other medical care and hospital programs and with the maintenance of high standards of medical care, including care of the veteran in his own community by a physician of his own choice.

Industrial Medicine.—Greater emphasis on the program of industrial medicine, with increased safeguards against industrial hazards and prevention of accidents occurring on the highway, home and on the farm.

Medical Education and Personnel.—Adequate support, with funds free from political control, domination and regulation, of the medical, dental and nursing schools and other institutions necessary for the training of specialized personnel required in the provision and distribution of medical care.

C.P.S. Anniversary

The growth and wide public acceptance of California Physicians' Service is today attracting nationwide attention as the organization observes its tenth anniversary.

Actually, the story of C.P.S. begins in Minneapolis, as far back as 1913, when Dr. Ray Lyman Wilbur, then 38 years of age, stood before the American Academy of Medicine. As president of

that organization, he spoke on the subject, "The Physician of the Future." In connection with a discussion of the radical social and mechanical changes which had appeared in American life and the great progress which had been made in medical science and knowledge, the speaker stressed the need of the medical profession to maintain its leadership in social thinking so as to avoid political involvement and control. The speech ended with these words: "The physician of the future has before him the great joy of meeting unsolved problems. He must be brave and learned and full of hope. He must retain the priceless heritage of personality that has come down to him, that spirit of independence that is his by every right, but he must likewise bend to the public need regardless of self. He must join with all of the social forces that can be assisted by his knowledge. The way is stony, but the future is bright; and we can have full faith that the physician of the future will not only see his duty but will meet it with that hope and courage that knows no obstacles and that recognizes no defeat."

The speech created wide discussion and thought, and in 1927 Dr. Wilbur was appointed chairman of the National Committee on Costs of Medical Care. Charged with the responsibility of conducting an extensive five-year survey, this group published its report, with recommendations for action, in 1932.

The report aroused a storm of praise and an equally enthusiastic storm of criticism. Throughout the country action and study ensued. One result was that in 1938 the California Medical Association became the first group to actively sponsor and authorize the formation of a voluntary prepayment plan. To implement the plan, California Physicians' Service was organized, with Dr. Wilbur as its president.

Among the first board members were the following medical leaders: Drs. T. Henshaw Kelly, Samuel Ayres, Jr., Dewey Powell, C. Kelly Canelo, Lowell S. Goin, W. Earl Mitchell, Glenn Myers, Alson Kilgore, Morton Gibbons, and E. Vincent Askey. Any list can only be partial, for the time and energies of hundreds of other doctors in California went into the solid foundation which was a prerequisite to today's growth and wide public acceptance. Lay representation consisted of Rt. Rev. Msgr. Thomas O'Dwyer, of Los Angeles, who still loyally supports C.P.S. as a member of the board.

When C.P.S. opened its doors in February 1939 the road ahead was tenuous and difficult. Nor did the original board of trustees or the initial professional membership of 5,000 California doctors expect an easy time. The idea of a medically sponsored prepayment plan to distribute the costs of medical care was widely disputed. There was no previous experience to serve as precedent. The public itself was wary. Many doctors questioned the procedure and operating philosophy of the organization. And admittedly, many of those problems and questions which arose were not easy to resolve.

But today, more than 710,000 Californians—beneficiary C.P.S. members—gratefully attest that through the difficult early years of trial and error, the medical profession provided a central theme of unity of purpose unmatched in medical economics. The record today shows that the formative years of doubt are over. The problems have been met and constructively translated into a successful and well-proved venture. The pride, satisfaction and appreciation of an ever-increasing beneficiary membership provides a resounding voice in favor of voluntary medical care. It attests the ability and willingness of the medical profession to foresee and take the leadership in meeting a widely recognized social need. Of even greater importance to the medical profession, California is being provided with indisputable evidence that voluntary, free enterprise plans can do a more professional and scientific job than could any compulsory or state-controlled plan.

In recognition of his vision, energy and leadership in California Physicians' Service, Dr. Ray Lyman Wilbur was recently presented with a scroll of appreciation in his Stanford University office. The scroll was signed by present members of the C.P.S. board of trustees, and was given to Dr. Wilbur by Dr. Chester L. Cooley, C.P.S. board secretary.

Statistics can be cumbersome, but a review of the ten-year record of beneficiary and professional membership reveals some gratifying facts: In January 1940, after one year of operation, C.P.S. had 20,000 beneficiary members and 5,000 professional members. (In ten years, beneficiary membership has multiplied by more than 35 times, and 97 per cent of the practicing physicians of California participate.) After five years of operation, C.P.S. opened the year 1944 with 90,000 beneficiary members and 5,200 professional members. (In the last five years — the years of greatest growth — C.P.S. has increased its coverage in beneficiary members by almost eight times.)

Growth such as this in ten short years is unparalleled in history. It dispels any notion, as forwarded by proponents of state plans, that voluntary systems "can't do the job fast enough." And the constant interest and supervision of the board of trustees—members of the profession—prove that the medical profession has not been, and is not today, incapable of adapting high professional standards to the needs of the public.

Today, more than 10,000 employee groups are member of C.P.S. Under the veterans' program, the doctors of California last year gave treatment for service-connected disabilities to an average of 12,000 to 15,000 veterans each month. New beneficiary memberships are being received at a rate of 23,000 new enrollments each month, and over 30,000 claims are paid for members.

The leadership of California's medical profession is recognized throughout the nation. Today there are 65 Blue Shield plans in 43 states and the District of Columbia, with the remaining five states soon to open similar programs. Many of these are adapted after C.P.S., and recognize C.P.S. as a leader and pioneer in the field. Along with Blue Cross and private insurance plans, it is estimated that 52 million Americans, more than one-third of the total population, are now protected under some form of hospital expense insurance, and that voluntary surgical expense plans cover 26 million, with 9 million persons covered by voluntary medical expense plans.

C.P.S. still is governed by an outstanding group of medical leaders. Dr. Goin is president; Dr. A. E. Moore and Dr. H. Randall Madeley are vice-presidents; Dr. Chester L. Cooley is secretary; Dr. Henry L. Gardner, treasurer. Other professional members of the board are Drs. Donald Cass, Kendrick Smith, J. Frank Doughty, Robertson Ward, John H. Rumsey and A. M. Meads. Rt. Rev. Msgr. Thomas O'Dwyer, Mr. Ransom Cook, and Mr. C. Ray Miller also serve as trustees. William M. Bowman is executive director.

C.P.S. Increases Payment to Physicians

Payments to physicians for services rendered to California Physicians' Service beneficiary members on or after January 1, 1949, will be based upon a unit value of $2.15.

This increase will bring an additional income to C.P.S. member physicians of approximately $700,000 yearly, if present utilization rates continue, it was estimated by C.P.S.

The increase in the unit value was made possible by the improvement in the C.P.S. cash position during the past 12-month period, the C.P.S. announcement said, and if no unfavorable change in utilization of service takes place, further increases in the unit value are planned for the future.

The action of the board of trustees in ordering the increase is in line with the stated policy of California Physicians' Service to bring the unit to par value as rapidly as circumstances permit.

Refresher Course on Cancer

The Cancer Commission of the California Medical Association announces a postgraduate (refresher) course on neoplastic diseases for practicing physicians to be given March 22 and 23 in cooperation with Stanford University School of Medicine, University of California Medical School and American Cancer Society, California Division.

Expenses incident to this course are being defrayed by the American Cancer Society, California Division.

Enrollment will be limited to 175. Applications for registration should be mailed to Dr. David A. Wood, Secretary, Cancer Commission, c/o California Division-American Cancer Society, 467 O'Farrell Street, San Francisco 2, California, not later than March 15, 1949.

The program for the two days follows:

TUESDAY, MARCH 22, 1949

Lane Hall, Stanford University Medical School, Sacramento and Webster Streets

9:00 a.m.—Introductory Remarks—Lyell C. Kinney, M.D., chairman, Cancer Commission.

Malignancies of the Head and Neck—A Symposium
H. Glenn Bell, M.D., moderator.

9:15– 9:35—The Eye and Ocular Appendages—Alfred E. Maumanee, M.D.
9:35– 9:45—Discussion.

9:45–10:05—The Lip—H. J. McCorkle, M.D.
10:05–10:15—Discussion.

10:15–10:35—The Tongue and Buccal Membranes—B. V. A. Low-Beer, M.D.
10:35–10:45—Discussion.

10:45–11:05—The Larynx and Pharynx—Robert C. McNaught, M.D.
11:05–11:15—Discussion.

11:15–11:35—The Ear—Nelson J. Howard, M.D.
11:35–11:45—Discussion.

11:45–12:05—Nodules in the Neck—H. Glenn Bell, M.D.
12:05–12:15—Discussion.

12:30 p.m.—Luncheon.

1:30– 1:50—Diagnosis of Cutaneous Malignancy—Norman Epstein, M.D.
1:50– 2:00—Discussion.

2:00– 2:20—Melanotic Tumors, Benign and Malignant—Nelson J. Howard, M.D.
2:20– 2:30—Discussion.

2:30– 2:40—Recess.

Symposium—Cancer of the Breast
Alson R. Kilgore, M.D., moderator.

2:40– 2:55—Examination to Distinguish Between True and False Lumps—L. R. Chandler, M.D.

2:55– 3:10—Discharge from the Nipple—Leon Goldman, M.D.

3:10– 3:30—Present Opinion About Irradiation as a Supplement to Surgery (in Operable Cancer)—Leonard Dobson, M.D., and Robert S. Stone, M.D.

3:30– 3:55—Hormone and Chemical Therapy—Michael B. Shimkin, M.D.
3:55– 4:45—Discussion.

EVENING SESSION

8:30 p.m.—Psychologic Implications of Cancer—Emile Holman, M.D.

Discussion opened by—Dwight L. Wilbur, M.D., Howard R. Bierman, M.D., Alexander Simon, M.D.

WEDNESDAY, MARCH 23, 1949

Toland Hall, University of California Medical School, Third Avenue and Parnassus

9:00 a.m.—Panel Discussion—Trauma and Cancer.
Clinical Aspects—Emmet L. Rixford, M.D., moderator.
Pathologic Aspects—David A. Wood, M.D.
Legal Aspects—Edmund Leonard, attorney-at-law.
Discussion.

10:30–10:50—Malignancy in the Male Genital Organs—E. P. Gaynor, M.D.

10:50–11:00—Discussion.

11:00—Cancer of the Colon and Rectum.
Premalignant Tumors—Russell R. Klein, M.D.
Malignant Tumors—Robert A. Scarborough, M.D.
Discussion.

12:30 p.m.—Luncheon.

Symposium on Gynecologic Cancer

Charles E. McLennon, M.D., moderator.

1:30– 1:45—General Problems in the Diagnosis of Bleeding Disturbances in the Female Genitals—Charles E. McLennon, M.D.

1:45– 1:55—Discussion.

1:55– 2:15—The Present Status of Cytologic Diagnosis in Genital Cancers—Herbert F. Traut, M.D.

2:15– 2:25—Discussion.

2:25– 2:45—Changing Concepts in the Therapy of Cancer of the Cervix—Ludwig A. Emge, M.D.

2:45– 2:55—Discussion.

2:55– 3:25—Diagnosis, Treatment and Prognosis in Endometrial Cancer—Earl B. King, M.D.

3:35– 3:45—Recess.

3:45– 4:15—Ovarian Cystadenocarcinomas—Ralph C. Benson, M.D.

4:15– 4:25—Discussion.

4:25– 4:45—The Effects of Pregnancy and Ovarian Function on Cancer—Carl Goetsch, M.D.

4:45– 4:55—Discussion.

Conference on Organization of Hospital Districts

A preliminary meeting of representatives of 29 of the 34 organized local hospital districts of California was held January 7 and 8 at Palm Springs for the purpose of setting up an organization to act as a clearing house for mutual problems, particularly for information regarding formation, planning, fund-raising and legal matters pertaining to district hospital organizations and legislative matters.

At the meeting, which was held at the invitation of the Desert Hospital District, Palm Springs, a temporary committee was appointed to formulate the organization and to consider affiliation with the Association of California Hospitals.

Dr. Jay J. Crane, California Medical Association councilor from Los Angeles, addressed the group on the C.M.A. attitude toward local district hospitals. Emphasizing that organized medicine is interested in providing the highest quality of medical and hospital service possible, he said this could be promoted by instituting and maintaining high standards in the individual hospitals. Questioned as to the attitude toward the use of local district hospitals by licensed osteopathic physicians and surgeons, Dr. Crane said that this was a matter for determination by the board of directors of each local district hospital. However, he called attention to the fact that no hospital could be accredited by the Hospital Committee of the American College of Surgeons or the Council on Medical Education and Hospitals of the American Medical Association if osteopathic physicians and surgeons were members of the staff.

In Memoriam

CARMICHAEL, HUGH. Died in Sacramento, January 13, 1949, aged 48, following a cerebral hemorrhage. Graduate of the College of Medical Evangelists, Loma Linda-Los Angeles, 1934. Licensed in California in 1934. Dr. Carmichael was a member of the Sacramento Society for Medical Improvement, the California Medical Association, and a Fellow of the American Medical Association.

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COBLENTZ, LAMBERT B. Died in San Francisco, January 28, 1949, aged 68, of coronary thrombosis resulting in heart failure. Graduate of the Cooper Medical College, San Francisco, 1904. Licensed in California in 1904. Dr. Coblentz was a member of the San Francisco County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

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DONOVAN, MONICA. Died in San Francisco, December 29, 1948, aged 56, of carcinoma. Graduate of Stanford University School of Medicine, Stanford University-San Francisco, 1917. Licensed in California in 1917. Dr. Donovan was a member of the San Francisco County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

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EASTMAN, FRANK CREIGHTON. Died in Vicksburg, Mississippi, January 14, 1949, aged 39, of a heart attack. Graduate of Stanford University School of Medicine, Stanford University-San Francisco, 1940. Licensed in California in 1940. Dr. Eastman was a member of the San Francisco County Medical Society, the California Medical Association, and the American Medical Association.

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JACOBSON, PETER NATHANIEL. Died in Oakland, December 10, 1948, aged 68, of a heart attack. Graduate of Cooper Medical College, San Francisco, 1905. Licensed in California in 1905. Dr. Jacobson was a member of the Alameda County Medical Association, the California Medical Association, and the American Medical Association.

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SCHNEDORF, JEROME GERALD. Died, in Big Bear, December 25, 1948, aged 35, of carbon monoxide poisoning and asphyxiation. Graduate of Northwestern University Medical

School, Chicago, 1938. Licensed in California in 1946. Doctor Schnedorf was a member of the Santa Barbara County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

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TORRENS, AARON SAMUEL. Died in Hanford, January 2, 1949, aged 69, following a stroke. Graduate of the University of Illinois College of Medicine, Chicago, 1909. Licensed in California in 1917. Dr. Torrens was a member of the Kings County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

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VAN DALSEM, SAMUEL BURNS. Died in San Jose, January 18, 1949, aged 73, of carcinoma. Graduate of Hahnemann Medical College and Hospital of Philadelphia, 1902. Licensed in California in 1902. Dr. Van Dalsem was a retired member of the Santa Clara County Medical Society, and the California Medical Association.

Lambert B. Coblentz

Lambert B. Coblentz, or, as he was affectionately known by his friends, "Bert" Coblentz, died on January 28, 1949, following an attack of coronary thrombosis suffered on a hunting trip some three weeks previously.

Dr. Coblentz was born in 1880 in Plymouth, Amador County, from where his parents moved, early in his life, to Santa Maria. After attending the University of California and graduation from Cooper Medical College in 1904, he interned at the old German Hospital, now the Franklin Hospital. Returning to Santa Maria to practice, he remained there until 1928, becoming during that time the town's most prominent physician and a civic leader. He moved to San Francisco to practice, and thenceforward his professional activities were largely identified with St. Luke's Hospital. He was a member of the department of medicine of the Stanford School of Medicine until he became emeritus in 1945. He also belonged to numerous medical societies and was active for several years as chairman of the professional conduct committee of the San Francisco County Medical Society, a capacity in which he used unusual skill and tact in the settlement of disputes. As a member of the executive committee of the Editorial Board, a position to which he was appointed in 1943 by Dr. George H. Kress who then was Editor, he served the journal of the California Medical Association willingly and well. At the time of his death he had been a member of the Family Club of San Francisco for over 30 years, and until a few years ago had also been an active member of the Presidio Golf Club.

Bert Coblentz had that rare gift of immediately feeling at home with a new acquaintance. It was therefore only natural that there were unusually many people who considered themselves his friends. He was always ready to lend a helping hand to anyone who needed it. His sense of humor was great, and his inexhaustible fund of stories, many of them dating back to practice in his early Santa Maria days, provided a good laugh on many an occasion. His patients had for him an attachment as well as a feeling of personal closeness and interest far above the usual physician-patient relationship. And so it is not surprising that in his last years it was his practice which, outside his family, consumed most of his interest.

It had been his great wish to go on with his practice and finally to die "with his boots on." While his going is an irreparable loss to his family, his patients and his friends, we can console ourselves a little by the thought that his wish was granted.

NEWS and NOTES

NATIONAL • STATE • COUNTY

ALAMEDA

The Rockefeller Foundation has pledged $100,000 for equipment for the new **virus laboratory** of the University of California at Berkeley which is to be under the direction of Dr. Wendell Stanley who joined the faculty last year. The funds will be available for purchases over a three-year period 1949-1951.

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In an attempt to rehabilitate alcoholics, habitual drunkards coming before police court magistrates in Alameda County will, upon conviction, be granted two years' probation and sent to the recently organized Alcoholic Clinic at Santa Rita Prison Farm. There they will be given psychiatric and medical treatment as indicated. Upon release from the clinic, they will be given employment and help by county social workers. The new clinic and the system for handling drunkards was established under an ordinance passed in December by the County Board of Supervisors.

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One thousand pints of whole blood was processed by the **blood bank** of the Alameda County Medical Association in January. A record high for the bank, made possible by its recent move to larger quarters especially designed for the service, the amount still was barely sufficient to meet the growing demand, the medical association reported.

CONTRA COSTA

Dr. George D. Husser of Richmond was installed recently as president of the Contra Costa County Medical Society to succeed Dr. H. B. Neufeld of Concord, who served in 1948. Other officers installed were Dr. C. M. Bolender of Walnut Creek as vice-president and Dr. Bernard B. Gadwood of Richmond as secretary.

LOS ANGELES

Appointment of Dr. John M. Chapman as head of the communicable disease unit of the Los Angeles Health Department has been announced by Dr. George M. Uhl, city health officer. Dr. Chapman, who formerly was director of the tuberculosis division, was named to the new post to fill a vacancy created by the death of Dr. Carl J. Hawley. Dr. Leo Tepper was appointed director of the tuberculosis division.

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Dr. Milo Ellik was installed as president and Dr. Harry Jacob as secretary-treasurer of the **Long Beach branch** of the Los Angeles County Medical Association at a recent meeting of that branch organization. Dr. Ellik succeeds Dr. Frederick Kellogg.

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The Los Angeles County Medical Association **Research Foundation** was officially established in January, with Dr. Louis J. Regan as president, Dr. Benton N. Colver, vice-president, Dr. H. E. Pearson, secretary and Dr. Eugene F. Hoffman, treasurer. Membership in the non-profit organization is made up of persons engaged in laboratory research in medical and allied fields. Besides fostering studies in the cause, prevention and cure of disease, the foundation will gather and administer funds for that purpose and disseminate information on problems and progress in the conquest of disease.

Dr. Elmer Belt was chairman of the meeting establishing the foundation, and Dr. Walter C. Alvarez of the Mayo Clinic spoke on "The Importance of Scientific Research."

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Dr. LeGrand Noyes was elected president and Dr. Franklin Ball vice-president of the Hollywood Academy of Medicine at a meeting in January. Dr. Walter Scott was elected secretary-treasurer.

ORANGE

Dr. Thomas B. Rhone, of Orange, was installed as president of the Orange County Medical Association for 1949 at the annual dinner meeting of the group. Dr. Ardeth Wightman of Laguna became vice-president, and Dr. Llewellyn E. Wilson secretary-treasurer.

SAN FRANCISCO

Dr. William Mushin, professor of anesthesiology at the University of Wales and the Royal College of Surgeons of England, will be visiting professor of anesthesiology at Stanford University School of Medicine for the period March 15 to May 15, Dr. Loren R. Chandler, dean of the school, announced recently.

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Four San Francisco physicians recently were awarded grants for **research on heart disease** by the American Foundation for High Blood Pressure. They are Dr. Norman E. Freeman, Dr. Meyer Friedman, Dr. Ernest W. Page of the University of California Medical School, and Dr. Lelland J. Rather of the Stanford University School of Medicine.

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Four grants totalling $117,461 for **cancer research** at the University of California Medical School were pledged last month by the United States Public Health Service. The largest award, $85,064, was made for support of research work in a ward at the Laguna Honda Home which accommodates 15 patients who volunteer for experimental treatment. A second grant, $25,000, was awarded to support a program for improving the methods of instruction with regard to cancer in medical schools, and a third grant of $4,320 was earmarked to aid studies being carried on by Dr. David M. Greenberg, professor of biochemistry on the Berkeley campus, relative to the process of protein formation. The fourth grant, $3,078, was awarded to support research in special kinds of tumors in mice which are being carried on by Dr. H. D. Moon of the laboratory of experimental oncology.

SANTA CLARA

Dr. Paul V. Morton, who for the past year has served as a director of the **Santa Clara Valley Blood Center,** recently was elected chairman of the board. He succeeded Dr. Donald R. Threlfall in that position. New members of the board of directors are Dr. William L. Molineux and Dr. Herbert T. Browne, who replace Dr. Leon P. Fox and Dr. Morton.

In efforts to stimulate the **recruitment of young women for training as nurses** to solve the shortage in this field, the Woman's Auxiliary to the Santa Clara County Medical Society is planning a bridge party to raise funds to augment a student loan fund, and at the same time is conducting a poster contest offering cash prizes to high school and junior high school pupils for the best posters calling attention to the attractiveness of nursing as a profession. In addition, the Woman's Auxiliary recently entertained students of the county's three nurse training schools at a formal dance at the San Jose Women's Club.

STANISLAUS

Physicians from Merced, Mariposa, San Joaquin and Tuolumne counties were guests of the Stanislaus County Medical Society February 17 at a **postgraduate seminar on heart disease** which was arranged jointly by the Postgraduate Committee of the California Medical Association, the California Heart Association, and the heart committee of the Stanislaus County Tuberculosis and Health Association. Morning, afternoon and evening sessions were held. The program was as follows:

Rheumatic fever. Case presentation and discussion.

The Pathogenesis and Practical Implications of Rheumatic Fever—Dr. Lowell A. Rantz of San Francisco.

Case presentation and discussion by the faculty.

Electrocardiograph Interpretation with Reference to the Precordial Leads—Dr. Maurice Sokolow of San Francisco.

Symposium on degenerative heart diseases. Differential Diagnosis of Chest Pain and Acute Coronary Disease—Dr. Charles A. Noble, Jr., of San Francisco.

The Management of Congestive Failure—Dr. Sokolow.

TEHAMA

Dr. James T. McDuffie of Corning has been elected president of the Tehama County Medical Association for 1949 to succeed Dr. R. G. Frey of Red Bluff, retiring president. Dr. Arthur H. Meuser of Corning became vice-president and Dr. Donald E. Thompson of Red Bluff, secretary-treasurer.

GENERAL

The California Society of Anesthesiologists will hold its first annual meeting in San Francisco, March 14-16. Further details may be obtained from the secretary of the Society, Dr. Bruce M. Anderson, Samuel Merritt Hospital, Oakland.

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The tenth annual spring postgraduate **Convention in Ophthalmology and Otolaryngology** will be held in Portland, June 19-24, under the auspices of the Oregon Academy of Ophthalmology and Otolaryngology. Guest speakers will be Dr. Lawrence R. Boies, professor of ophthalmology at the University of Minnesota Medical School; Dr. Leland Hunnicutt, associate clinical professor of otolaryngology at University of Southern California; Dr. James H. Allen, professor of ophthalmology at Iowa State University School of Medicine, and Dr. Edmund B. Spaeth, professor of ophthalmology, Graduate School of Medicine, University of Pennsylvania.

Medical Films - Annual Session

Facilities will be available for showing 16 mm. sound or silent films at the 1949 Annual Session of the California Medical Association to be held in Los Angeles May 8 to 11. To select films suitable for showing and to make up a program for their showing, a special committee has been named by the Committee on Scientific Work.

Any member who has one or more films available for this showing should contact Dr. Conrad J. Baumgartner, 409 N. Camden Drive, Beverly Hills. Films should be shipped to Dr. Baumgartner for viewing by the committee. They should be sent as soon as possible and in no case later than April 1, 1949.

BOOK REVIEWS

CLINICAL UROLOGY, ESSENTIALS OF DIAGNOSIS AND TREATMENT. Second Edition. By Lowrain E. McCrea, M.D., Clinical Professor of Urology, Temple University Medical School. 265 illustrations, 7 color plates. F. A. Davis Company, Publishers, Philadelphia, 1948. $6.50.

This is a treatise for the general practitioner and part-time urologist. It is a ready reference work as an aid in the diagnosis and treatment of urologic conditions usually seen in the office. Many techniques and therapeutic procedures are concisely outlined and drugs which the author has found of value are described in detail. Data on the most recent use of the sulfonamides and antibiotics have been brought up to date, not in a single or separate chapter, but in association with the variously described pathologic conditions. A number of rare and unusual conditions, some almost medical curiosities, are described at length with numerous photographs. There are many good illustrations, some depicting pathologic conditions, other schematically showing the technique of various urologic procedures. The type used is large and clear, the paper good and the book easy to read.

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BAILEY'S TEXTBOOK OF HISTOLOGY. Revised by Philip E. Smith, Ph.D., Professor of Anatomy, College of Physicians and Surgeons, Columbia University, and Wilfred M. Copenhaver, Ph.D., Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, The Williams and Wilkins Company, Baltimore, Maryland, 1948. $7.00. 800 pages, 455 illustrations. Twelfth Edition.

Of the standard textbooks of medical histology this one, now in its twelfth edition, presents the subject in a highly lucid manner and is certainly one of the outstanding books in the field. The illustrations which accompany the text are numerous, well chosen, and clearly reproduced. The revisions in this edition correct a number of faulty portions of the previous volume and include the results of many recent developments.

The book is organized into 22 chapters of which the first three are devoted to considerations of the cell and to development. Of unique interest in this connection is Chapter II, which discusses the structure and function of living cells and the methods by which such observations of living cells are established. Within the 20 pages of this chapter a concise and stimulating introduction to the vast and ever-widening field of cellular physiology is presented to the student. The next seven chapters are devoted to a consideration of the tissues of the body, while the remaining 12 describe the organ systems.

Considerable repetition of ideas is to be noted in the three chapters devoted to nervous tissue and the nervous system which take up one-eighth of the entire text. Some of the material presented is more appropriate to a text of neuroanatomy. It is suggested by the reviewer that the space devoted to this subject be condensed into a single, more concise chapter.

The authors' intent is that this text be primarily for the use of first-year medical and dental students and for this purpose it is admirably suited in clarity and conciseness of description, judicious handling of controversial points and nicety of illustration. The inclusion of a few key references for each chapter may stimulate the reader to further exploration within the limits of his time.

The reviewer is of the opinion that the text, while in no sense a complete reference work, deserves a place in the library of the practicing physician, the research worker, and the biological scientist because of its able and broad coverage of the subject of histology.

TREATMENT OF HEART DISEASE. By William A. Brams, M.S., M.D., Ph.D., Associate Professor of Medicine, Northwestern University Medical School, and Attending Physician, Michael Reese Hospital, Chicago. New, First Edition. 195 pages, with 11 figures. Philadelphia & London: W. B. Saunders Company, 1948. Price $3.50.

This book is a compact discussion of cardiac therapy and is a sound, conservative, practical discussion of the subject. The author is well qualified to guide the practitioner in this important sphere of medicine and has produced a very comprehensive book despite its relatively small size. In addition to the usual systematic discussion, Dr. Brams has included excellent chapters on the pharmacology of drugs such as digitalis, quinidine, the mercurials, etc., that are used in the treatment of heart disease.

A few minor criticisms may be of value. In the treatment of cardiac failure, the author advocates absolute bed rest and in the interest of the patient's comfort, advises a rolled pillow under the knees (p. 54). The dangers of venous thrombosis by this procedure were not noted by the author and most cardiologists would hesitate to advise anything that increases the risk of embolic complications in a severely ill chronic cardiac patient. The therapeutic value of aminophylline in acute pulmonary edema has been minimized by the author (p. 71), especially in view of the work of McMichael and his associates who demonstrated a marked fall in right atrial pressure and a rise in cardiac output in patients with left ventricular failure. The author advises a single oral dose of 1.2 mg. of digitoxin when cardiac failure occurs after myocardial infarction (p. 85). The dangers of inducing ventricular arrhythmias and of inducing vomiting with a single large dose of digitoxin are such that divided doses are preferable. On page 100 Brams states that slowing of the ventricles to a normal range is a satisfactory therapeutic result in the treatment of auricular flutter. The danger of a sudden decrease in A. V. block with abrupt doubling of the ventricular rate and possibility of acute symptoms is a good reason for advising further attempts to produce a normal rhythm by increasing the amount of digitalis or utilizing quinidine in all cases in which no contraindication exists.

In the next edition it would be advisable to expand the important chapter on congenital heart disease and pericarditis. These are given inadequate treatment. Further data on the use of massive doses of penicillin in subacute bacterial endocarditis with resistant organisms would also be important. On page 118, the author implies that 6,000,000 units daily is the maximum dose used. The use of fourfold this amount is not uncommon. The possibilities of the therapeutic use of streptomycin were not discussed.

Despite the above criticisms, the book can be recommended as a valuable and practical discussion of the current methods of treatment of heart disease.

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PHYSICIAN'S HANDBOOK, FIFTH EDITION. By John Warkentin, Ph.D., M.D., and Jack D. Lange, M.S., M.D., University Medical Publishers, P. O. Box 761, Palo Alto, California. Price $2.00.

The value of this compact handbook is attested by the appearance of a new edition within two years. As the authors have stated in their preface, the purpose of the book was to summarize concisely, clearly and comprehensively, diagnostic procedures, factual data and other reference data serviceable for many types of medical practice. In the reviewer's opinion, the authors have succeeded admirably and this book can be recommended as one of the most complete pocket reference manuals available. The

necessity for brevity has prevented elaboration on certain therapeutic suggestions but this is a minor criticism. The inclusion of considerable new data in this revision indicates the constant attempts of the authors to keep the handbook alive and up-to-date.

* * *

MICROBIOLOGY AND PATHOLOGY. By Charles F. Carter, B.S., M.D., Instructor in Pathology and Applied Microbiology, Parkland Hospital School of Nursing, Dallas, Texas. With 216 Text Illustrations and 25 Color Plates. Fourth Edition. The C. V. Mosby Company, St. Louis, Mo., 1948. $5.00.

This book is designed for the teaching of nurses. It covers a very large field, and so cannot be expected to go into great detail. This has apparently been recognized, and simple conventional presentations have been used. Controversial discussions are rarely included, and relatively little is said of the pathogenesis of the diseases discussed. The illustrations in the section devoted to pathology emphasize the gross features of disease. At the end of each chapter is a series of questions for review and a group of "true-false" and "completion" statements is included. A final short chapter outlines some simple laboratory exercises.

The book is probably satisfactory for the teaching of nurses, and it would convey a general idea of medicine to a layman, but this idea would be inadequate with respect to the problems of medicine and to the complexity of the subject.

* * *

A TEXTBOOK OF PATHOLOGY. By E. T. Bell, M.D., Professor of Pathology, University of Minnesota, 910 pages, 500 engravings and 4 color plates. Sixth Edition. Lea and Febiger, Philadelphia, Pa., 1947. $10.00.

The sixth edition of Bell's Textbook of Pathology conforms to the high standards of previous editions. The greater part of the book is written by Dr. E. T. Bell, the chapter on heart disease by Dr. B. J. Clawson, and the chapter on liver disease by Dr. J. S. McCartney. Both of the latter have spent many years in study on the subjects discussed by them.

The book is written largely from the authors' own experiences and opinions and the text is agreeably free from discussion of theories and disputed subjects. Parts of the text of the previous edition have been revised and new material, especially in the fields of vitamin deficiencies and tropical diseases, has been added in order to bring the text in accord with current medical opinion and interest. The authors' many years of experience, however, have kept them from going too far with new ideas as yet not conclusively proved.

The book is divided about equally into the discussion of general fundamental pathological processes and description of diseased conditions of organs of the body. Discussion of most of the subjects is flavored with conservative clinical correlation. Particularly is this true in the chapter on renal disease, a subject on which Dr. Bell has been an outstanding authority for years. However, there is no discussion of the subject of lower nephron nephrosis under this title, but if the reader is qualified to do his own hunting he will find interspersed in the text information about most of the various conditions producing this lesion. The description of virus pneumonia, in this reviewer's opinion, is insufficient for the importance of this disease.

The illustrations, 500 in all, are well chosen and they are for the most part well made, clear photographs. The quality of the photomicrographs is not surpassed by any textbook of pathology in use in this country today. A fairly adequate list of references is given at the end of each chapter. Some of these lists include a few too many of a decade ago and not enough of those of the last few years, which are more available to readers without access to large medical libraries.

On the whole this book, written in a conservative style in easily read English, should serve well as a textbook for students and as a storehouse of information for the practicing physician.

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PARATHYROID GLANDS AND METABOLIC BONE DISEASE. By Fuller Albright, M.D., Associate Professor, Medicine, Harvard Medical School; and Edward C. Reifenstein, Jr., M.D., Consultant-in-Charge, Department of Clinical Investigation, Sloan-Kettering Institute of Cancer Research, Memorial Hospital Cancer Center, N. Y. The Williams and Wilkins Company, Baltimore, Md., 1948. $8.00.

The monograph on some special disease or group of disorders has come to occupy an important place in modern medical literature. The background of clinical medicine has become almost unbelievably complex, and precise discussion by the skilled specialist is essential if the general physician is to be educated and trained for the best sort of practice.

The writers have done their audience a great service in bringing together their pioneer work and summarizing that of others on the important subject of metabolic bone disease. The discussion proceeds in orderly fashion—the principles of normal growth of bone, pathological physiology and finally the actual applications to disease. Although Dr. Albright writes in a delightfully lucid style one soon realizes the immense complexity of the subject, and especially the abstruse interaction of many chemical factors which in parts of the discussion leaves the reader quite confused. The text is profusely illustrated with charts, tables, photographs, and other visual aids to understanding such an involved subject. We have seen few books recently which have given us more pleasure and satisfaction; Dr. Albright and Dr. Reifenstein have set up standards of scholarship of which American medicine may well be proud.

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CRIME AND THE MIND—AN OUTLINE OF PSYCHIATRIC CRIMINOLOGY. By Walter Bromberg, M.D., formerly Director, Psychiatric Clinic, Court of General Sessions, New York, N. Y. and Senior Psychiatrist, Bellevue Psychiatric Hospital, New York, N. Y. J. B. Lippincott Company, Philadelphia, 1948. $4.50.

This is an interesting account, from the psychoanalytic viewpoint, of the psychopathology of various types of criminal. The author has had a good deal of experience in dealing with this problem, both in the Navy and civilian courts, and although one cannot always subscribe to his interpretation of the case histories he presents, the material in itself is of considerable value. He makes a valiant attempt in the first few pages to avoid the use of analytical terms, but the effort proves too much for him and he soon lapses into the usual clichés.

There are two pitfalls for the physician untrained in psychiatry in reading this book; he may either credulously accept all of the author's interpretations as reliable, or he may, in being unable to swallow some of the more extravagant of them, disgorge the whole. If these dangers can be avoided, there is much to be learned from this volume.

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MALIGNANT DISEASE AND ITS TREATMENT BY RADIUM. By Sir Stanford Cade, K.B.E., C.B., F.R.C.S. Surgeon, Westminster Hospital, Mount Vernon Hospital and Radium Institute. With a Foreword by Sir Ernest Rock Carling, F.R.C.P. Volume I, Second Edition. The Williams and Wilkins Co., Baltimore, Maryland, 1948. $12.50.

Although the first edition of this book, published in 1940, was almost immediately destroyed by bombing, the author is now republishing it.

Dosage in radium therapy has for many years been, for the most part, empirical in nature. Perhaps as a result it has become traditional in radium texts to refer to dosage only in the widest generalities. Unfortunately this book does not deviate from this tradition, and even though information is

available on modern methods of radiation dosimetry, as the references indicate, the subject is unfortunately covered only sketchily.

It would also be nice to know what the safe dosage is near structures such as the eye, instead of being informed, "Prolonged gamma radiation . . . is likely to lead to permanent damage and should be avoided . . ." Naturally what the radium therapist wants most to know is what is meant by "prolonged radiation."

Chapters on the effects of radium on malignant tumors and on tissue culture and experimental radiology are well done.

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CONTEMPORARY RELIGIOUS JURISPRUDENCE. By T. H. Rubenstein of the Illinois Bar. The Waldain Press, Chicago, 1948. $2.50.

In the 120 pages of "Contemporary Religious Jurisprudence," I. H. Rubenstein of the Illinois bar attempts to clarify and state the criminal and civil aspects of the major polemical tenets of fortune-telling, faith healing and pacifism.

With candid frankness and honesty the author aptly points out the conflict of these tenets with the public welfare, health, morals and safety of society. With each of the three tenets of fortune-telling, faith healing and pacifism the author gives a brief definition and history, and then explores the criminal and civil aspects with relation to society as a whole.

With the two tenets of fortune-telling and faith healing, the irreconcilable conflict with medical practice acts is pointedly brought out. This is done by the narration of actual cases and experiences which are of record. The fact is made clear that if the advocates of these tenets were allowed to exploit civilization, they would repeal all medical and public health safeguards and expose the nation to the menace of uncontrolled, unguided and unintelligible practice of the healing arts.

In his treatise on all of the three tenets the author points out that "Law, with its consequence in justice, must act as a bulwark of Society against the onslaughts of those who would use religion as a word to gain their fanatical desires and ends."

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STANDARD RADIOGRAPHIC POSITIONS. By Nancy Davies, M.S.R., C.T. Senior Radiographer, Malvern General Hospital, Malvern, and Ursel Isenburg, M.S.R. Radiographer, Royal Free Hospital, London. Second Edition. The Williams and Wilkins Co., Baltimore, 1948. $6.00.

This text is elementary in nature, and uses only line drawings instead of actual radiographs. Nevertheless, it covers the subject quite well, and should prove to be useful for those who are beginning the study of x-ray technique.

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CONTROL OF PAIN IN CHILDBIRTH—Anesthesia—Analgesia—Amnesia. By Clifford B. Lull, M.D., Director, Division of Obstetrics and Gynecology, Philadelphia Lying-in Unit, Pennsylvania Hospital; and Robert A. Hingson, M.D., Associate Professor of Obstetrics; Anesthesiologist, Department of Obstetrics, Johns Hopkins University Hospital; Surgeon, U.S.P.H.S. Introduction by Norris W. Vaux, M.D., Consulting Obstetrician and Gynecologist, Philadelphia Lying-in Unit of Pennsylvania Hospital. Third Edition. Revised and Enlarged. J. B. Lippincott Company, Philadelphia, 1948. $12.00.

This important and extensive survey of obstetric analgesia and anesthesia, now appearing in its third edition within four years, has been reviewed elsewhere on numerous occasions. The first quarter of the volume includes a basic discussion of sacral anatomy and of the innervation of uterus and bladder, contributed by two anatomists from Washington University, as well as a pharmacologic description of all the agents commonly administered during labor and delivery. At the end of Part One there is a brief essay on the psychology of fear during labor, but since this chapter amounts essentially to an advertisement for caudal anesthesia it could well be omitted. Part Two, the largest section, is concerned largely with details of the various techniques for relieving obstetric pain. In this section the book suffers from the fact that the authors have appropriated and reproduced verbatim several articles which have appeared in periodicals, such as the lengthy article on saddle-block anesthesia by Andros and others which was published in the American Journal of Obstetrics and Gynecology, May 1948, while in other instances subsections have been contributed by quite an array of persons, some of whose names are mentioned briefly in the preface. The result is confusion, repetition, and lack of editorial coherence, not to mention a surfeit of graphs, charts, tables and drawings, many of which have been taken from the brochures of pharmaceutical manufacturers. It appears that this section of the book badly needs rewriting in the language of the authors. Part Three (which is not denoted as such in the table of contents) undertakes to discuss the choice of anesthesia for an extensive array of obstetrical complications and includes a chapter on care of the newborn infant, written by two pediatricians. Some of the material in this chapter seems out of place in a volume on anesthesia. The last 25 pages of the book are given over to reprinting in its entirety an article on newborn mortality which appeared in the Journal of the American Medical Association for January 24, 1948. Here again one questions the desirability of including material in this form within the covers of a book. Despite these obvious shortcomings the volume is a real storehouse of information and will continue to be a standard reference in its field.

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SYNOPSIS OF PSYCHOSOMATIC DIAGNOSIS AND TREATMENT. By Flanders Dunbar, M.D. and others and the members of the staff of the departments of Medicine and Psychiatry Columbia-Presbyterian Medical Center, New York City. The C. V. Mosby Company, St. Louis, Mo., 1948. $6.50.

The author has compiled a very useful handbook on psychosomatic diagnosis and treatment for the general practitioner. It is exceedingly logical and simple, and a valuable volume for the library of every physician. The introductory chapter defines "Functional Diseases" and brings them within the purview of psychosomatic medicine. Emphasis is placed upon the unknown menace of the psychoneuroses, and indications are given that etiologically these disorders may arise from the tempo of our civilization. It is significant that there is a marked psychosomatic component in hypertension, hyperventilation and hyperthyroidism, and many other diseases, and that the change in the incidence of peptic ulcer and coronary artery disease in the male is in part a resultant of the cultural pressure of society on the individual. The diseases to which an individual may become heir are the results of the interplay of the physical and psychic constitutions. There is an excellent chapter on embryology in its relation to psychosomatic disorders, wherein illness is considered essentially a response, conditioned or unconditioned, to a stimulus acting upon the individual at any moment of his existence. In the chapter on predisposition to psychosomatic dysfunction, the author discusses the mechanism of organ selection as an expression of the preponderant emphasis of the emotions on the soma. Many of these predispositions may be acquired in utero or in early life. There is a fine chapter on the physiology of the autonomic nervous system in which is discussed the effect of psychic impulses on the mechanisms of disorder of the nervous system.

The chapter on the psyche in relation to the gastrointes-

tinal tract and especially on the disease entity, colitis, is very fine. The approach in this field is purely objective, and the information discussed is essential to the internist and general practitioner.

The chapter on the vasomotor system, especially in relation to disorders of the skin, sheds new light upon the intricacies of this subject. The author emphasizes that disorders of the skin are greater than skin deep. The chapter on the eye, ear, nose, throat and dentition is excellent and well authenticated with photographs and references.

There is a section devoted to metabolic and endocrine disturbances with special emphasis given to the subject of diabetes. In this disease it is absolutely necessary to appraise the psyche in order to understand the behavior of the diabetic patient. The same applies to the understanding of hyperthyroidism and obesity. A chapter on arthritis and joint diseases, including an excellent essay on gout, throws new light upon the psychic components in these disorders. The remainder of the book is devoted to the circulatory system, the respiratory system (a fine discussion of the psychosomatic aspects of asthma), the genito-urinary disorders, with a terse and intelligent presentation of the problem of impotence and frigidity, and then two fine chapters on "accident-proneness" and the neuroses, the latter being especially pointed, and understandable.

The volume is highly recommended for the physician's library.

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AN INTRODUCTION TO GASTROENTEROLOGY. By Walter C. Alvarez, M.D., Professor of Medicine, University of Minnesota, The Mayo Foundation. Fourth Edition, Revised and Enlarged. 269 Illustrations. Paul B. Hoeber, Inc., Medical Book Department of Harper and Brothers, New York, 1948. $12.50.

The fourth edition of Alvarez's book is an expansion of the third. The heaviest additions are in the chapters on the pylorus, the nerves to the bowel, the nerves of the gallbladder, the functions of the colon, flatulence, the electroenterogram, technical methods and apparatus and the effect of vagotomy in man. It serves admirably as a summary of the author's ideas and work during the past 30 years, especially on the gradient theory, to which the entire first portion of the book is devoted.

It is an excellent reference for anyone doing research in gastroenterology and for the gastroenterologist in practice. It is well and interestingly written. However, one sometimes has difficulty in separating Dr. Alvarez's own ideas or theories from the record of more proved facts.

The bibliography is extensive, running to 2,800 titles and 136 pages. Unfortunately, these articles are not numbered, which makes it difficult to trace the source work—especially when one author has multiple articles to which one reference is made. There is a summary at the end of each chapter giving the essentials of the chapter for those not wishing to go through the whole of it. These summaries in themselves are quite full, at times running to more than five pages.

The Paul B. Hoeber Company has done a handsome job of printing and binding.

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BIOLOGY OF PATHOGENIC FUNGI. Edited by Walter J. Nickerson. This is Volume VI of the "Annales Cryptogamici et Phytopathologici," published at Waltham, Mass., the Chronica Botanica Co., San Francisco, J. W. Stacey, Inc. Price, $5.00.

This book is the first of its kind, in the English language, which brings together present knowledge of the biology of pathogenic fungi. As J. Gardner Hopkins points out in the foreword, much effort has been expended on arguing nomenclature in mycology to the neglect of studies on the biology of the fungi themselves, a subject of much greater importance for the diagnosis and cure of fungus diseases.

The present volume is of great value to mycologists, laboratory workers, and dermatologists. There are outstanding chapters on nutrition and metabolism of pathogenic fungi, the metabolic products of fungi, the lipids, respiration and fermentation. The chapter on chromoblastomycosis appears somewhat lengthy and out of proportion for North American readers.

The biologic approach to the fungus diseases is as fundamental and will be just as productive of results as has been the biologic approach to other disease problems. The editor, the contributors, and the publishers are to be congratulated on having made a very important step in this field.

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THE CASE AGAINST SOCIALIZED MEDICINE—A Constructive Analysis of the Attempt to Collectivize American Medicine. By Lawrence Sullivan. The Statesman Press, National Press Building, Washington 4, D. C., 1948. $1.50.

This is a brief but cogent statement of many of the drawbacks inevitable in socialized medicine, written by a Washington journalist who has also published some interesting volumes on bureaucracy in our national capital. The arguments are familiar to most medical men but perhaps to few of the public. For this reason, physicians might be well advised to send copies of this book to their friends who are in a position to influence legislation, especially members of the labor movement, thoughtful social workers, congressmen and senators.

In so doing they might care to stress the enormous swelling of the numbers of people attending doctors' offices and out-patient departments in hospitals under any socialized scheme. Trivial ailments, that are normally passed over, occupy 90 per cent of the doctor's time. Laboratory tests and x-rays triple in number, over three-fourths of them being a waste of time and material. Besides filling out innumerable forms, the doctor has to account for every little item for which he needs replacement. For example, even the smallest suture needle, when rusted or broken, must not be discarded. It must be returned to headquarters before a new one can be issued.

One large hospital clinic in England recently ran out of 6-inch plaster strips for treating ordinary traumatic lesions of the leg and trunk. Some official in London had cancelled the hospital order for plaster of paris bandages for some reason or other. Now the over-worked nursing and medical staff must find time to make home-made bandages for these cases. These are facts which your reviewer can validate by date and institution.

Physicians should remember that actual practice of their profession is but one part of their contribution to public welfare. Another and significant part is the maintenance of conditions under which good medical services can be furnished. This little book may aid in such maintenance.

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CLINICAL NEURO-OPHTHALMOLOGY. By Frank B. Walsh, M.D., Associate Professor of Ophthalmology, Johns Hopkins Medical School. Williams and Wilkins, Baltimore, Md., 1947. $18.00.

Clinical Neuro-Ophthalmology is a very comprehensive textbook. The subject matter occupies 1,422 pages and 17 chapters.

The book is too exhaustive to attempt to outline, but it can be pointed out that it is in itself a reference library on this subject.

Chapter IV upon pupillary responses and Chapter VII upon congenital abnormalities and diseases of the eye and the central nervous system are small texts in themselves.

This book is a text and reference book that should be in every ophthalmological library.

MEDICAL JURISPRUDENCE

CONSENT TO THE PERFORMANCE OF OPERATIONS—INCOMPETENT ADULTS—RESTORATION TO COMPETENCY

PEART, BARATY & HASSARD *of the California Bar*

It is a rule of very general application that a physician or surgeon cannot operate upon a patient without first obtaining the consent of that patient. In order to give this consent, the patient, of course, must be legally competent. Two classes of persons are recognized by the law as being incapable of giving such consent, that is: (1) minors; and (2) mentally incompetent adults.

This discussion will concern itself only with the second class and the procedure whereby a person who has been adjudicated an incompetent and has been committed to a state institution may be restored to legal capacity and thereafter, may be able to consent to an operation. Under Section 6729 of the Welfare and Institution Code, a superintendent of a state hospital may discharge any patient who "in his judgment" has recovered. The superintendent must merely file his written certificate with the Director of Institutions. Thereafter, the person who has been committed may be released and may ostensibly appear to be legally competent. However, the discharge by the superintendent of a state hospital in and of itself does not have the legal force and effect of restoring the patient to competency. Thus, any patient who has once been committed and thereafter released cannot legally consent to an operation, for he has not as yet been legally restored to competency. If a doctor in treating a patient becomes aware of the fact that a patient has once been an inmate of a state institution, he should immediately proceed with caution and determine whether the patient has been legally restored to competency.

A patient in this state can be restored to competency if the superintendent of the state hospital, after discharging the patient who, in his judgment, has recovered, files his written certificate to that effect with the Director of Institutions and under Section 6729 of the Welfare and Institution Code, sends a copy of the certificate of discharge duly certified to the clerk of the superior court of the county from which the person was committed. The certified copy and the record of the same must then be recorded by the clerk of that Superior Court in a book kept for that purpose, and thereafter this record shall have the same legal force and effect as a judgment of restoration to capacity. This method of restoration to capacity is in addition to a formal adjudication of competency by a court in a guardianship proceeding. If the requirements have not been complied with, then legally the patient is still incompetent and therefore unable to legally consent to any operation.